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Foreign Agriculture

.....a Review of Foreign Farm Policy, Production, and Trade

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AGRICULTURE IN CHINA . . . . .

By Fred J. Rossiter*

Agriculture, the basic industry of mankind, has been the foundation of Chinese civilization for the past 4,000 years. The Chinese nation during these centuries was self-sufficient insofar as food and clothing were concerned, and this contributed to the philosophy of isolation from other countries. For several centuries Chinese silk and tea were in demand by western nations, but foreign countries had little in the way of agricultural products that was desired by the Chinese. Only in recent decades have China's general agricultural imports and exports been of any significance in world trade. And even today the volume of China's foreign agricultural trade is very small in comparison with domestic production. Probably less than 2 percent of China's total agricultural requirements are imported; and, since more than 400 million people must be fed and clothed, it is evident that agriculture is a significant industry of the country.

AGRICULTURE, THE LEADING INDUSTRY

China is one of the largest agricultural producing countries of the world, ranking with the United States, the Soviet Union, and India. Available information indicates that China leads all countries in the production of rice, soybeans, millet, and many minor commodities. In wheat production, China frequently ranks next to the Soviet Union and ahead of the United States. In total tobacco production, China ranks along with the United States and India in first place, and in cotton production is in third place after the United States and India.

The cultivated area of China is 40 or 50 percent smaller than that of the United States; yet China produces sufficient food to feed three and one-half times the population of this country. Chinese farming is intensive because of the large population per unit of land cultivated. Fields are generally small, and a large amount of human labor is used on each acre of cropland. For example, in China 750 man-hours of labor are required to produce an acre of rice, compared with 25 in the United States, according to survey records made in the respective countries. Chinese general farm practice compares with truck farming in the United States, since hand labor performs most of the planting, cultivating, and harvesting, while power (in China, horse or ox) is generally used for plowing and harrowing.

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* Senior Agricultural Economist, Office of Foreign Agricultural Relations, stationed for 11 years in the Orient. This article is based on conditions in China prior to the Sino-Japanese conflict that began in July 1937. In the summary, however, a consideration of the present situation is given.

Too large a rural population for the amount of cultivated area has been recognized as a serious problem in China for nearly a century. Chinese people endeavoring to improve their economic standing have migrated in large numbers to other areas for the past several decades. Several million have gone from South China to the Straits Settlements, the Netherlands Indies, and other southern countries, and from 1905 to 1931 several million from North China sought to better their livelihood in Manchuria. It is believed, however, that the total migration has had little effect on reducing the density of population.

More than 80 percent of China's vast population are engaged in farming as their principal means of livelihood. The great majority of farmers derive a very small income and therefore have a low standard of living. The standards of South China are above those of North China. The warm climate in the south permits food production the entire year, whereas in the north the country people must obtain their living almost entirely from summer crops.

The diet of the Chinese people has been adapted to the agricultural production of the various regions in which they live. Rice, the basic crop of the country, is the principal food for more than 60 percent of the Chinese people. Americans have frequently expressed their sympathy for the Chinese because they have to live on rice and have no other food. The fact is, however, that the Chinese people consider a rice diet an indication of a high standard of living and feel prosperous when they can afford to eat rice three times a day. Approximately 40 percent of the Chinese population, mostly in northern and northwestern China, seldom, if ever, eat rice. Their principal food consists of millet, kaoliang (grain sorghum), wheat flour, corn, sweet potatoes, and various types of soybeans.

Only a small amount of meat and practically no dairy products are consumed by the average Chinese family. The raising of livestock is only a byproduct in the Chinese agricultural industry. Protein in the Chinese diet is very largely obtained from vegetable oilseeds, such as soybeans and peanuts.

In international agricultural trade, China has during the past 20 years been an important exporter and importer of several farm commodities. This agricultural trade for several decades has contributed a very large share to China's total foreign commerce. From 70 to 85 percent of total exports have consisted of farm products. Of total imports, agricultural goods represented from 33 to 58 percent until 1936, when they fell to about 24 percent. China from 1923 to 1935 was the world's largest rice-importing country, from 1924 to 1932 the third largest tobacco importer, and from 1930 to 1934 the third largest wheat-importing nation. On the other hand, China is one of the world's largest sources of vegetable oils and oilseeds.

The United States has been one of the chief suppliers of agricultural products imported into China and has also been one of the leading markets for China's agricultural exports. Included in China's principal agricultural imports have been such American products as flue-cured tobacco, raw cotton, and frequently wheat and wheat flour. China has also been a minor importer of American dairy products and fruits, such as oranges, apples, and raisins.

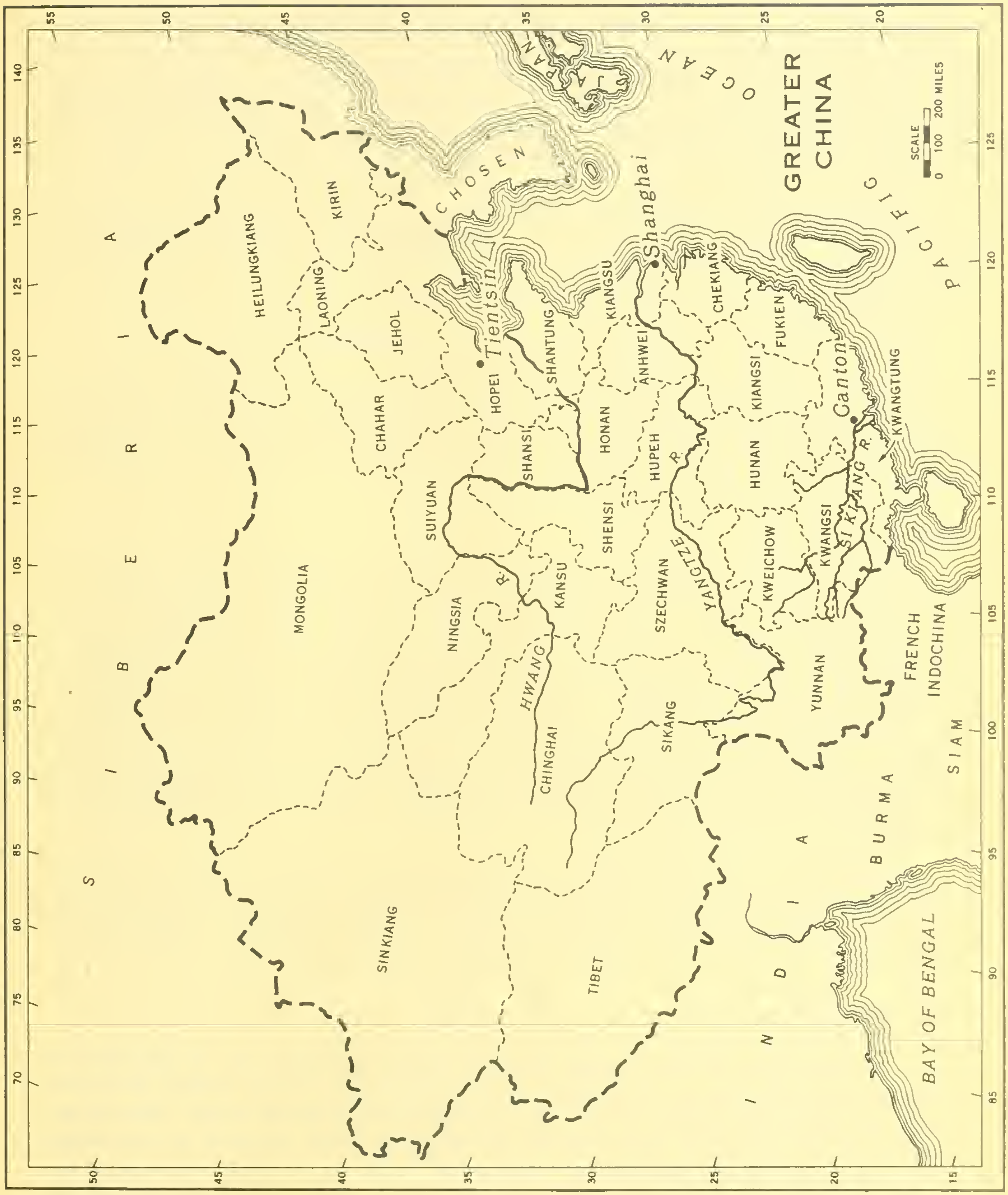

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Fig. 1.

Chinese agricultural exports to the United States have consisted of a varied list of commodities, depending upon the American market, American tariff rates, and their availability in China, which has been somewhat irregular as a result of unsettled political conditions. Wood oil, hides, and skins have been among the important commodities regularly imported from China. The United States usually purchases limited quantities of Chinese carpet wool, egg products, walnut kernels, silk, and tea, and during periods of domestic shortage of vegetable oil secures important quantities of peanuts and other oilseeds from China.

Since China ranks near the top among agricultural producing and consuming countries and in recent years has had an important share in the international agricultural trade, it is of interest to learn about this nation's basic agriculture and the factors that influence production and trade.

CHINA - A LARGE AND DENSELY POPULATED COUNTRY

The Chinese Republic consists of China Proper, Mongolia, Sinkiang, and Tibet. Manchuria, consisting of the three northeastern Provinces and Jehol Province, is not included in this study, for this area has not been under the control of the Chinese Government during the past few years.

GEOGRAPHIC POSITION

The regions of Mongolia, Sinkiang, and Tibet are sparsely settled, have climatic conditions unfavorable for agricultural production, and have practically no value in international agricultural trade except for wool, hides, and skins. The same holds true for the Provinces of Chinghai and Sikang, except that these have slightly more agricultural value. The three Provinces Chahar, Suiyuan, and Ningsia, frequently called Inner Mongolia, have large areas of uncultivated land, but this section is fairly important for grazing and in the southern portien has some crop production. The 18 Provinces in the eastern and southern parts of China, sometimes called China Proper, have natural resources adapted to agricultural cultivation and are important in international agricultural trade.

China Proper lies between 22 and 42 degrees north latitude, which is the same range of latitude as that in North America from Tampico, Mexico, to Chicago. The Provinces of Inner Mongolia extend further north, and Outer Mongolia reaches approximately 52° N., or about the same as the southern end of Hudson Bay.

AREA AND POPULATION

The total area of the Chinese Republic, excluding Manchuria, is estimated at 3,985,348 square miles, which compares with continental United States, excluding Alaska, of 3,026,808 square miles. The 18 Provinces of China Proper have an estimated area of 1,445,000 square miles, or less than half the area of the United States. The western and northwestern regions of China, which have little or no agricultural value, represent more than 50 percent of the total area. The three Provinces of Chahar, Suiyuan, and Ningsia have an area of 326,000 square miles.

Table 1. Area and population of China, 1936

PROVINCE	AREA	POPULATION
	Square miles	Thousands
China Proper-		
Kiangsu	41,830	36,469
Chekiang	39,791	21,231
Anhwei	51,902	23,265
Kiangsi	77,301	15,820
Hupeh	80,190	25,542
Hunan	91,595	28,294
Szechwan	166,528	52,963
Hopei	59,336	28,645
Shangtung	69,216	38,029
Shansi	60,206	11,601
Honan	66,693	34,290
Shensi	72,353	7,718
Kansu	145,969	6,705
Fukien	61,275	11,756
Kwangtung	83,940	32,385
Kwangsi	84,007	13,385
Yunnan	123,572	11,995
Kweichow	69,297	9,043
Total China Proper	1,445,001	409,136
Inner Mongolia-		
Chahar	107,705	2,036
Suiyuan	112,522	2,084
Ningsia	106,143	1,023
Total Inner Mongolia	326,370	5,143
Sikang	143,475	968
Chinghai	269,187	1,196
Sinkiang	705,953	4,360
Mongolia	625,946	2,078
Tibet	469,416	3,722
Total China	3,985,348	426,603

Chinese Economic Journal, March 1937.

The population, excluding that of Manchuria, was estimated for 1936 at about 426,603.000 by the Directorate of Statistics of the National Government of China. Where census data have been taken in small areas in China, however, it has been found that the actual number exceeded the estimated population. It is therefore reasonable to assume that the present population is approximately 450 million. In western and northern parts of China, which represent 50 percent of the area, the population is estimated at less than 18 million. The population of the 18 Provinces of China Proper was officially estimated at 409,136,000, and it can be safely assumed that this area has as many as 430 million people.

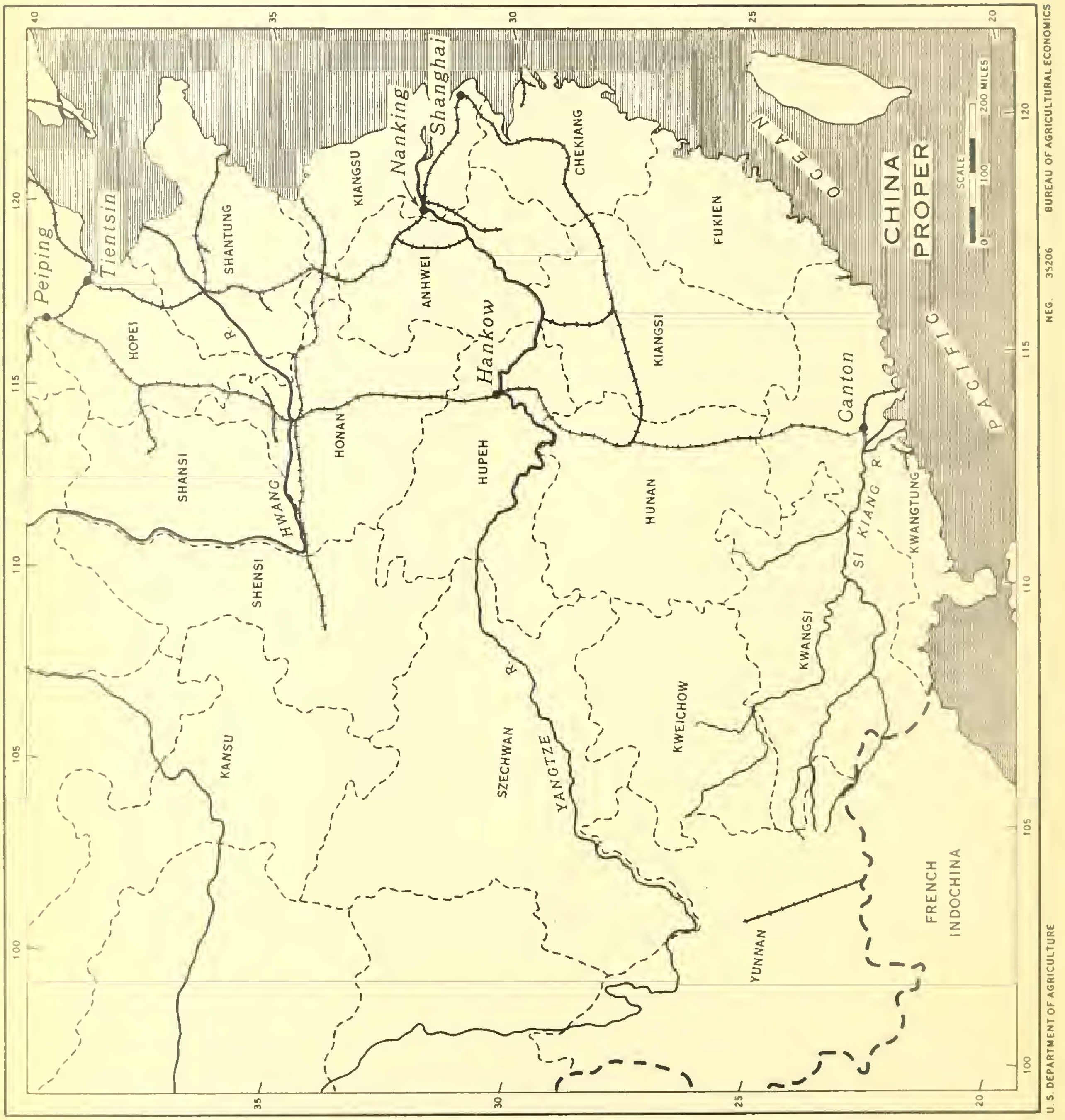

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Fig. 2.

The density of population for the 18 Provinces is about 300 per square mile. This compares with 42 in the United States, 197 in France, and 365 in Germany. This lower density of population in China as compared with Germany is explained by the fact that in China there is a large amount of uncultivated land. When the density of population of the 18 Provinces is considered on a cultivated-land-area basis, it is found that there are, on an average, 1,560 people per square mile, which is in comparison with 200 in the United States and approximately 1,000 in Germany. In some of the rural valleys of South China, it is estimated that the density reaches 6,000 people per square mile.

PHYSICAL FACTORS AFFECTING AGRICULTURE

A country the size of China has many wide and significant variations in the physical and economic factors that affect agricultural production and trade. Climatic conditions vary from the temperate to the subtropical; rainfall from light irregular to heavy annual; and soil from alkaline to acid. Food, clothing, and even the nature of the people vary as between different regions. Therefore, in this discussion the country is geographically divided roughly into three regions; namely, North China, the Yangtze Valley, and South China. A more detailed division of the cropping area is considered later.

CLIMATE

China, located as it is on the eastern side of Asia, has several climatic factors characteristic of this geographical area. The eastern coast of Eurasia, like the eastern coast of America, is colder in winter and warmer in summer for the same latitude than is western Europe and the west coast of America. The climate of South China and the Yangtze Valley is characterized by warm summers and mild winters with abundant annual rainfall, while North China has warm summers and cold winters with scanty and precarious rainfall.

China's climatic conditions are strongly influenced by the deserts of inner Asia, which experience extreme ranges of heat and cold. Altitude and prevailing winds also affect the climate. During the summer months the air over the interior of Asia becomes heated and expands. When this warm air rises, it moves eastward toward the Pacific. When it comes into contact with the cooler air of the ocean, precipitation results, furnishing North China with its heavy rainfall during July and August. In winter the cold, dry air from the interior brings extreme cold weather for North China and Manchuria. The Siberian winter anticyclone has the highest pressures on record. It is said that no continent exhibits this circulatory system so strongly as Asia and that the climatic effects are most pronounced in China.

Temperature - The temperatures of South and North China are approximately the same in summer but differ greatly in winter. The mean July temperature for Wuchow, Kwangsi Province, South China, is 84.2° F. and for Taming, Hopei Province, an interior city of North China, 84° F. On the other hand, the mean January temperature for Wuchow is 57° F. and for Taming, 28° F.[1]

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[1] Chapman, B. Burgoyne, *The Climatic Regions of China*, University of Nanking, Bulletin No 3, 1933

In South China, where frost seldom occurs except on the higher elevations, subtropical fruits and other crops are grown. In the Yangtze Valley, central China, 285 days, on an average, are free from frost, and a large percentage of the land is in winter crops and vegetables. In North China, on the plains an average of 222 days are free from frost, while in the northwest at the higher altitude of north Shansi, with a similar latitude, only 140 days are frost-free.

Table 2. Temperatures in China, by regions
(Fahrenheit)

MONTH	SOUTH CHINA		YANGTZE VALLEY		NORTH CHINA	
	WUCHOW	SWATOW	SHANGHAI	HANKOW	TIENTSIN	TAMING
	Degrees	*Degrees*	*Degrees*	*Degrees*	*Degrees*	*Degrees*
January	57	59	38	40	25	28
February	57	57	39	43	29	33
March	63	62	46	50	40	42
April	71	69	56	62	55	58
May	79	76	66	71	67	71
June	83	81	73	80	75	78
July	84	83	80	85	79	84
August	84	83	80	85	79	82
September	82	81	73	77	69	71
October	76	76	63	67	58	61
November	67	68	52	55	40	44
December	60	61	42	45	27	33

Chapman, B. Burgoyne, *The Climatic Regions of China*, University of Nanking, Bulletin No. 3, 1933.

Monsoons - Monsoons have an influence upon the climate of China, although some authorities believe that the effect has been somewhat overemphasized. The prevailing winds during the summer are from the south or southeast, while in winter from the north or northeast. In North China the winter winds are very cold and are frequently accompanied by violent dust storms that extend over wide areas.

Typhoons - The tropical typhoon affects the climate of South China. Typhoons originate east of the Philippine Islands and move toward the China coast. They usually occur from late May until about October 1. Over a 30-year period, from 1893 to 1924, an average of 8 or 9 typhoons per year struck the China coast.[2] They are usually accompanied by very high winds, followed by heavy, driving rain that is often quite destructive to crops. Quite a large percentage of the summer rainfall of the southeastern Provinces comes from these storms.

Rainfall - The amount of rainfall in China varies considerably, depending upon the region. The greatest precipitation occurs in South China with a gradual lessening to the north and west. In some districts of South China the average exceeds 70 inches, at Hankow in the central Yangtze Valley it is 49 inches, and in the northwest portion of the 18 Provinces the total is less than 15 inches.

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[2] Gherzi, E., *Winds Along the China Coast and in the Yangtze Valley*, Zikawei Observatory, Shanghai, 1931.

Rainfall in all sections of China is heaviest in summer. In South China it is generally heaviest from May to July and is sufficient during other months for crop production. In the Yangtze Valley heaviest rainfall usually occurs during June and July and is sufficient, on an average, for growing crops during the other seasons of the year. In North China rainfall is uncertain and distribution is unsatisfactory. Over 50 percent of the precipitation occurs during July and August, whereas in the spring and autumn rainfall is frequently insufficient for successful crop production.

Table 3. Rainfall in China, by regions

MONTH	SOUTH CHINA		YANGTZE VALLEY		NORTH CHINA	
	WUCHOW	SWATOW	SHANGHAI	HANKOW	TIENTSIN	TAMING
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
January	1.2	1.4	2.0	1.8	0.2	.4
February	1.9	2.5	2.4	1.9	.1	.3
March	3.4	3.1	3.4	3.8	.4	.5
April	6.7	5.7	3.7	6.0	.7	.5
May	8.0	9.0	3.6	6.5	1.1	.8
June	7.7	10.5	7.4	9.6	2.5	2.4
July	6.6	7.8	5.9	7.1	6.9	5.2
August	7.1	8.3	5.7	3.8	5.2	5.6
September	3.9	5.5	4.7	2.8	1.9	3.1
October	1.4	2.9	3.1	3.2	.6	.5
November	1.7	1.5	2.0	1.9	.4	.4
December	1.5	1.5	2.5	1.1	.1	.2
Total	51.1	59.7	46.4	49.5	20.1	19.9

Chapman, B Burgoyne, *op. cit.*

Floods and droughts - Floods and droughts, which occur more often and probably cause greater loss of crops, property, and lives in China than in any other part of the world, are caused primarily by the extreme variations in the amount of rainfall. Other contributory causes are (1) lack of forests and vegetation, causing quick run-off, (2) lack of systematic flood control (the central Chinese Government only recently began effective work along this line), and (3) prevalence of the type of soil that erodes easily, especially in northern and northwestern China, which silts up the rivers and canals and causes them to overflow.

This last factor, soil erosion, explains why North China, the regions of least rainfall in China, has the worst floods. It is claimed that every 40 years 1 mile is added to the delta of the Yellow (Hwang) River. This represents only a small percentage of the silt carried, since a much greater amount is deposited in streams en route to the coast during the last 400 miles of slowly flowing water.[3]

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[3] Studies of the amount of silt in flood water made by John R. Freeman, Director of Grand Canal Improvement Investigations, found in 1919 that the water of the Yellow River contained silt to an average of 6.5 percent by weight. (See *Flood Problems in China*, by John R. Freeman, p. 1148.)

A very large amount of soil erosion takes place as a result of the loess type of soil in northwestern China. In the upper Yellow River Valley there are very wide areas of loess deposits; and, when the protective vegetation is removed, this type of soil is exposed to active and rapid erosion. It is this erosion that, through the agency of the rapid run-off of the heavy summer rains, charges the flood water with unbelievable quantities of silt. The streams come down out of the loess hills as fluid mud. Great quantities of silt are dumped on the plain to choke up natural and artificial channels. The silt, by its quick settling qualities, has progressively raised the beds of the streams above the plains. The silt burden, accordingly, rather than the volume of water, has been primarily responsible for many of the flood problems of North China.

Droughts also occur in northern and northwestern China, where rainfall is scanty and precarious. Frequently in small districts, and about every 10 or 15 years in wide areas of North China, the entire growing season is without sufficient rainfall. If there are no spring rains, it is impossible to plant summer crops and the winter wheat harvest is usually a failure, except in some districts for the farmers having irrigation. Following a dry spring, if there are no rains during June and July, it is impossible to plant late summer crops; and famine conditions are certain to follow. Most farmers have very small reserves of food and have little means by which to secure food from other sources.

TOPOGRAPHY

About 85 percent of China consists of mountains and high plateaus. In fact, the plains of North China and the Yangtze delta comprise the only extensive level areas in the country. Cropping land in other parts is found principally in river valleys, terraced hillsides, and in northwestern China on plateaus.

In North China the low level plains of Hopei, northeastern Honan, Shantung, and the northern half of Anhwei and Kiangsu Provinces compose by far the most extensive level area in China. It is believed this formerly lay beneath the ocean, that the hills and mountains were formerly islands, and that during previous ages the sea covering this area was filled with soil washed and blown from the continent. Alluvial deposits by the Yellow (Hwang) River were undoubtedly an important factor in this transition.

In the Yangtze Valley there are a number of small level sections, but most of the region is hilly and mountainous. The level sections consist largely of the Yangtze River delta, the Wuhu plain, the Poyang Lake plain, the Tu Ting Lake plain, and the Chengtu plain. These sections are intensively cultivated and densely populated. The hills and mountains, on the other hand, are of little agricultural value. The hills are usually of poor soil formations unsuitable for crop cultivation. The mountains are largely of granite with sufficient soil only for grass and trees. Some of the hilly and mountainous areas are used extensively for tea cultivation.

In South China approximately 90 percent of the area consists of hills and mountains. Small level valleys near the mouths of rivers represent a large percentage of the cultivated area. A small portion of the hills and mountains are terraced, some for dry-land cultivation and some for rice farming. While some of the mountains are quite steep, most of them are covered with sufficient soil for growing grass and trees.

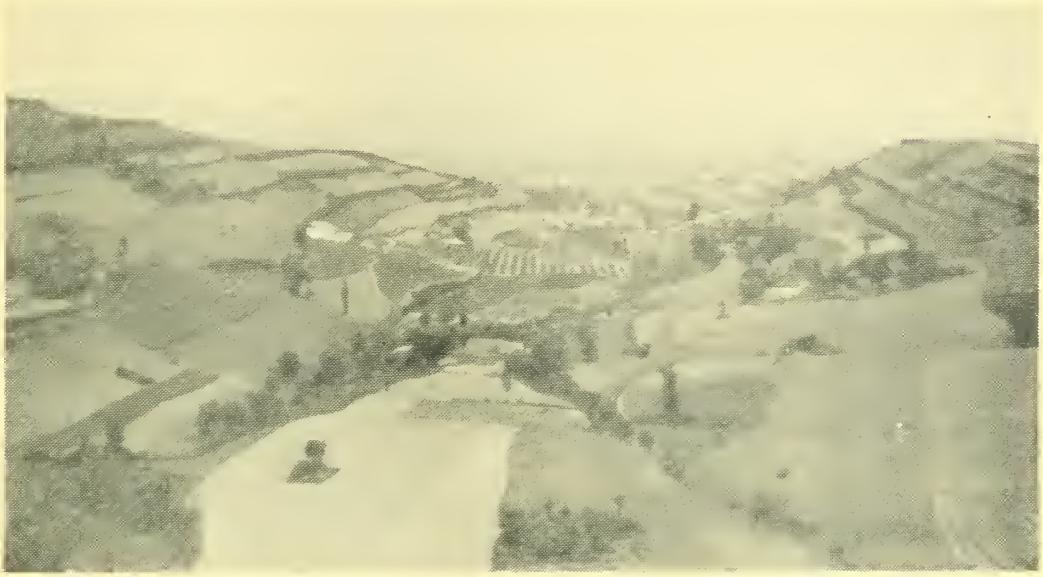

Fig. 3. The topography of China is hilly and mountainous except for a few large plains and numerous valleys.

Fig. 4. A large percentage of the area south of the Yangtze River is mountainous - rice farming is general where water and level ground are available.

West of the large plain region in North China is the mountainous area of Shansi and Shensi Provinces. Along the rivers and higher plateaus is level land suitable for cropping, though the growing season is shorter. There are several mountain ranges and high dirt hills in the area, the latter being subject to much erosion. A sparser growth of grass and trees is found on the mountainsides than in South China as a result of less rainfall and colder climate. In the northwestern Provinces of Chahar, Suiyuan, Ningsia, and Mongolia, the topography is characterized by mountains and high rolling plateaus. These regions of low annual rainfall form the grazing areas for Mongolians, who obtain their living principally from grazing livestock. Much of Mongolia is desert.

In the far western parts of China - Chinghai, Sikang, Tibet, and Sinkiang - most of the area is very mountainous with high elevation and a very small percentage of the land cultivable. Northern Sinkiang is largely a desert. The percentage of cultivated land for the whole area of China is very small, and estimates for the 18 Provinces vary from 17[4] to 25[5] percent. South China, which has a much more favorable climate for crop production, has a much smaller percentage of cultivable land. The eight Provinces south of the Yangtze River have but 11 percent of their area cultivated. The three important agricultural Provinces of North China, Shantung, Honan, and Hopei, have a greater amount of cultivated land than the eight Provinces of South China but support a much smaller population.

The total cultivated area of the 18 Provinces of China is estimated by one authority at 165 million[4] and by another at 232 million[5] acres, which compares with about 420 million for the United States. Some writers are of the opinion that large areas of cultivable land in China are unused, that the Chinese people do not wish to leave home and refuse to migrate to the undeveloped sections. It is true that there is additional land that could be cultivated, especially in the northwest in the Provinces of Chahar, Suiyuan, Ningsia, and Kansu. In these areas, however, rainfall is usually insufficient for crop production. In some districts the Government could build irrigation projects; but, without railways for marketing the products, such construction would not be justified.

There are other areas suitable for cultivation in the 18 Provinces not now being used. In some, such as the arid districts of Kiangsi, the soil is lacking in food elements necessary for growing crops. Other areas are now too sandy or too salty. Swamps could be drained, hillsides terraced, and land occupied by graves utilized. The development of these areas is generally too large an undertaking for individual farmers, but the Government recently attempted some reclamation work. If all land that was economic to farm were developed, it is doubtful if the total area would be increased more than 2 percent. In some areas, hillsides once cultivated have now gone back into grass, for it was found to be uneconomic to farm them.

SOILS A WIDE VARIATION

China, like other large countries, has a wide variation of soils, formed from the weathering of various kinds of rocks and mineral materials. Residual soils, that is, those that remain in the area where formed, occur generally on the hills and mountains. In China a very large proportion of the soils developed from residual materials are exceedingly low in fertility, and, with the exception of Szechwan Province, only relatively small residual-soil areas are cultivated.[6]

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[4] Cheng, C. C. *An Estimate of China's Farms and Crops*, Nanking, 1932

[5] Buck, J. Lossing, *Land Utilization in China*, Shanghai, 1937, I 165-166

Soils formed from transported materials, such as loess and alluvial deposits carried by wind and water, make up about 90 percent of the cultivated fields of China. A very large share of these soil materials has been transported in relatively recent times and has a wide range of fertility. The loess deposits are found in the northwest, principally in the Provinces of Kansu, Shensi, Shansi, and parts of Hopei and Honan. Extensive alluvial soils are found in the Yellow and Yangtze River Valleys and along other rivers of eastern and southern China.

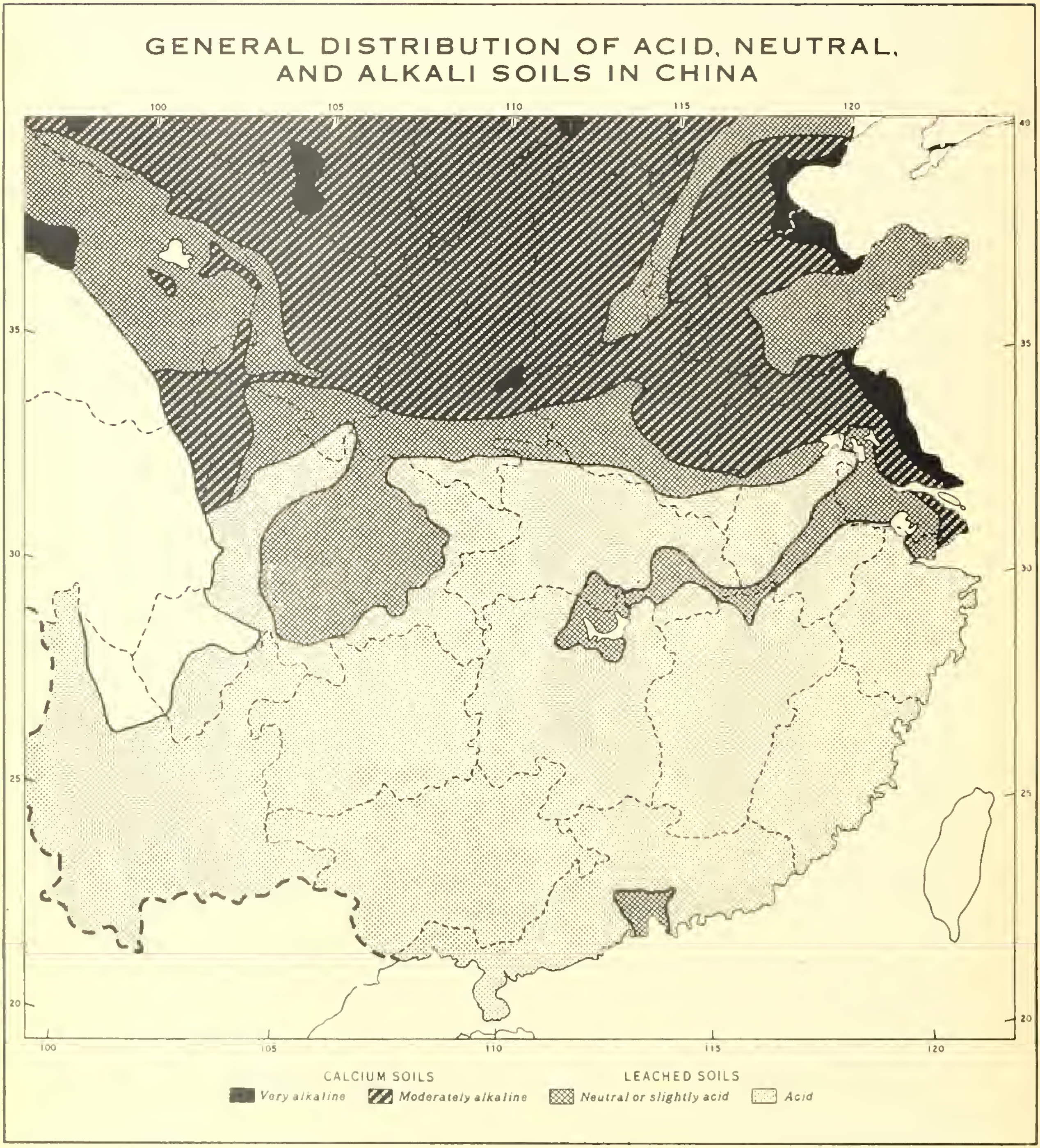
The soils of China are classified into two main groups, "calcium soils" and "leached soils," according to James Thorp. Calcium soils vary from slightly to extremely alkaline and occur in dry areas where the annual rainfall is limited. Leached soils, as the name indicates, are moderately to strongly leached, are more or less acid in reaction, and occur generally in humid areas where there is a relatively large amount of rainfall.

From figure 5 it is noted that the calcium soils are found in North China and the leached soils primarily in the Yangtze Valley and South China. More than 98 percent of the rice crop in China is grown on leached soils. On the calcium soils wheat, kaoliang, and millet are the principal crops, although cotton and flue-cured tobacco are also grown. Rice is raised only in a few localities on calcium soils. These soils contain sufficient fertility, but their porous structure and the lack of rainfall in the areas where they occur are unfavorable for rice production.

The calcium soils of North China may be subdivided into several groups on the basis of variations in their characteristics. The most important subdivision of the group is the calcareous alluvium, which represents the soil of an area sometimes called the Great Plain of North China. This type of soil reflects the character of the materials from which it has been formed, most of which have been brought down by the Yellow River and smaller streams from the great loess and red-clay deposits of the northwestern Provinces.

The loess deposits from which this alluvium is largely derived consist of great drifts of limey dust, which were blown by the winds in prehistoric times from the central Asian deserts to northwestern China. These yellowish loess dust deposits have accumulated to depths varying from a few inches to hundreds of feet; and, as they are not consolidated into rock, the rivers and creeks are cutting into them rapidly and carrying the materials down to the great delta plains of Honan, Hopei, and Shantung. The dust is still shifted by the winds during dry periods.

[6] This section is based primarily upon information secured from *Geography of the Soils of China*, by James Thorp Chief Soil Technologist, National Geological Survey of China, on leave of absence from the United States Bureau of Chemistry and Soils Published by the National Geological Survey of China, Nanking, 1936.



GENERAL DISTRIBUTION OF ACID, NEUTRAL, AND ALKALI SOILS IN CHINA

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Fig. 5.

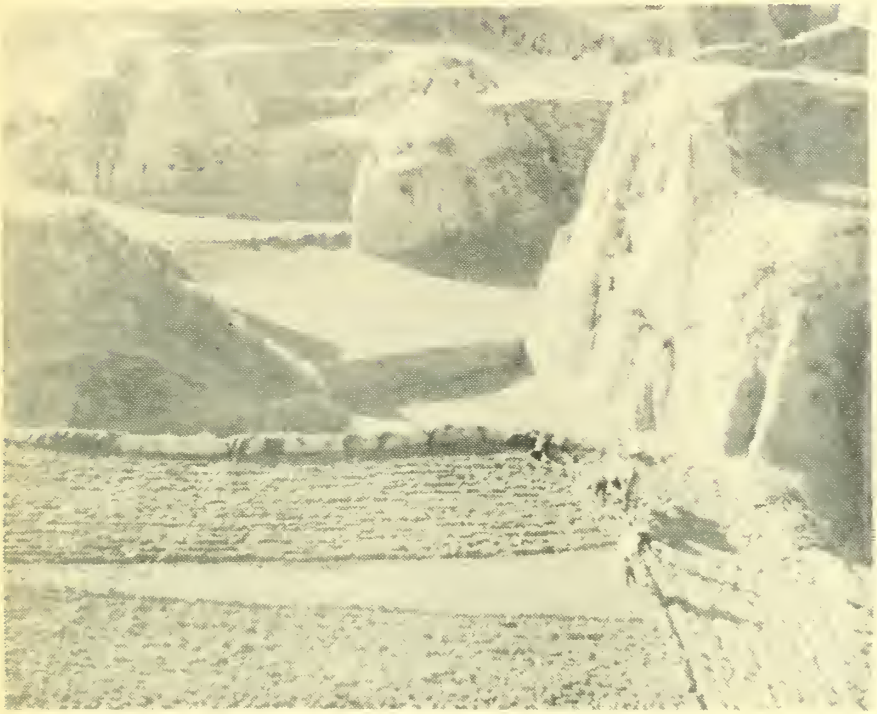

Fig. 6. Loess soil in northwestern China. The soils are productive but proper rainfall is very important since heavy rains are the cause of distructive erosion and light rainfall of crop failure.

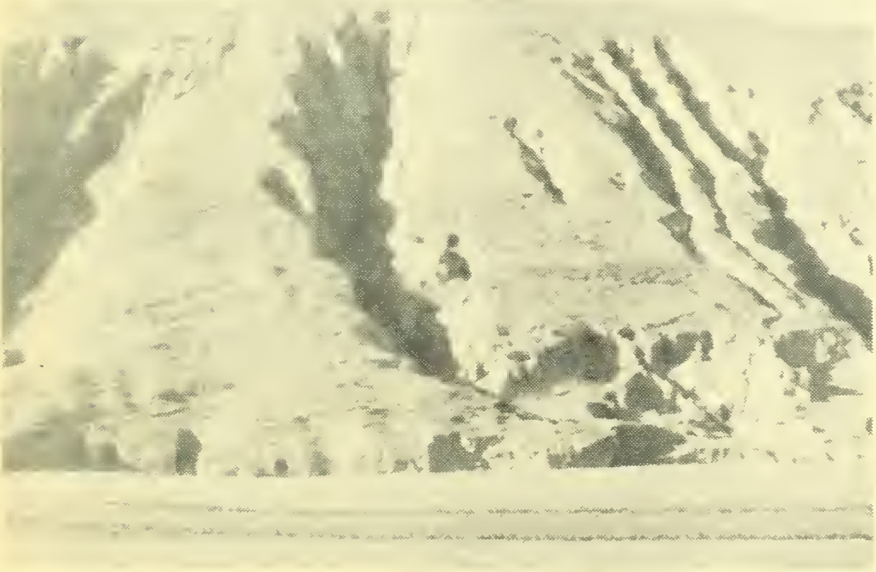

Fig. 7. Soil erosion is very heavy in North China.

The soils of this calcareous alluvium group may be subdivided into silty soils, sandy deposits, and saline and alkaline soils. The silty soils are the most important geographically and are also the most productive of all the calcareous alluvial lands. They are dominantly light-yellowish or grayish-brown in color and are very porous and granular. Silty soils are mostly well supplied with essential mineral plant nutrients but are generally low in organic matter.

The sandy deposits are made by the large rivers, which overflow and leave the sandy materials near their banks. The finer silts are carried farther from the stream channels. A large area of this sandy type of soil is found near Kaifeng, Honan, where the Yellow River has overflowed and spread a vast amount of sand over formerly productive land.

Saline and alkaline soils are widely distributed in poorly drained spots over North China, with the larger areas shown on the soil map. These soils contain excessive amounts of soluble salts; and, unless drained and washed free of the salts, they are unsuitable for producing crops.

The soils of the greater part of the rice belt belong to the group of leached soils, which are slightly to strongly acid. Strange though it may seem, the mountains of this area contain much rock that through weathering continually gives off lime. If the lime remained in the soil, it would neutralize the acidity; but, because of the heavy rainfall, it is carried away as rapidly as it is formed or released. Much of the upland and terrace soils of South China, because of heavy rains, have not only the lime content leached out, but also a large part of the other soluble mineral plant nutrients, so that these soils are the most unproductive of the humid area.

The alluvial soils of the Yangtze Valley and South China, which consist of surface soil and the weathered rock minerals washed from the hills and mountains, form most of the cultivated rice land. The fields are kept productive by continual fertilization and careful cultivation. The rice land is frequently limed to neutralize the developed acidity and is heavily fertilized to maintain the intensive rice production.

The soils of greatest agricultural importance within the region of leached soils are those that have very recently been deposited on the alluvial plains and deltas of the various rivers of central and southern China. Every time there is a flood, new materials are deposited on the flood plains. Most of the alluvial lands have a heavy texture and are well adapted to rice culture. These soils hold water for longer periods than do the more porous of the silty and loamy soils in the upland fields.

There are, in addition to the types of soils already mentioned, a great many variations found in China. Two other types are of sufficient importance to be mentioned; namely the so-called red soils of Szechwan and the brown soils of Shantung. Szechwan is peculiarly fortunate in having a very large area of relatively fertile soils, despite the fact that it has heavy rainfall and a humid climate. Szechwan surface soils are slightly acid or neutral, purplish-brown, brown, or reddish brown, and are underlain by a purple or reddish-purple clay or clay loam. Parent materials comprise purple or purplish-red shale, loamstones, and sandstones. These parent rocks are supposed to have been laid down in or around the bed of a great lake or inland sea during the Cretaceous period. The Szechwan basin is almost universally hilly, and the soft Cretaceous materials are continually being exposed by erosion more rapidly than the humid climate can accomplish leaching. Soils form quickly and the formation of new and rich soils just about balances erosion. Wherever irrigation is possible, rice is grown on these fertile soils.

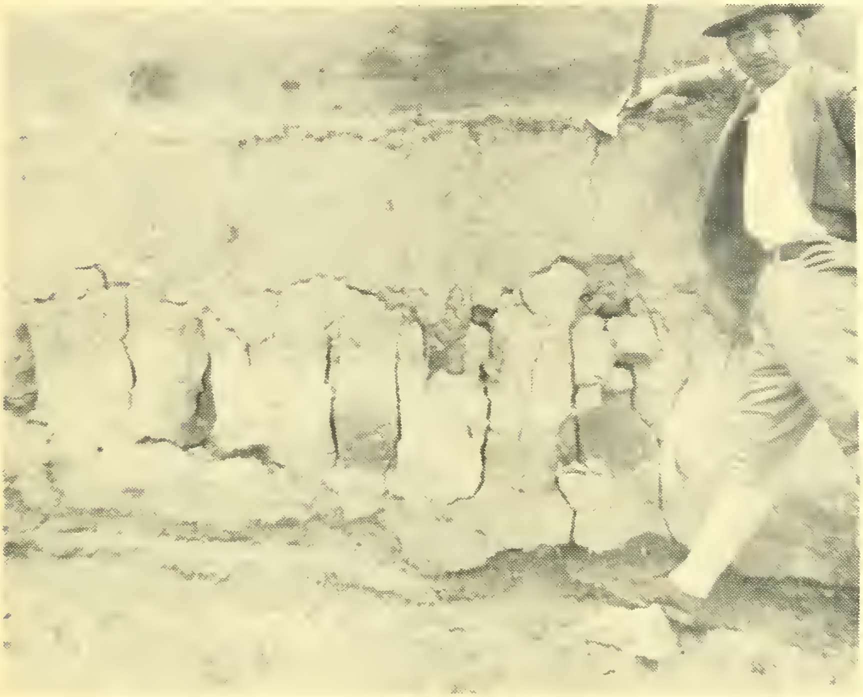

Fig. 8. Rice soil in South China. Note the impervious subsoil about 2 feet below the surface, which is well suited for rice farming.

In Shantung Province there is a large area of land in which brown soils are dominant. These are slightly acid, bright brown to dull brown, loamy, surface soils, granular in structure, and therefore easily tilled. In many sections the subsoil is of clay texture, yellow-brown to red-brown in color, and is stiff and heavy. The commonest parent materials are gneiss and granite; small areas are also derived from sandstones and shales. The recently deposited alluvial soils, found in some sections, are usually very sandy. Shantung brown soils are well adapted to the production of winter wheat, kaoliang, and millet. The soils lack organic matter and in the production of the more profitable crops must generally be well fertilized.

AGRICULTURAL PRODUCING AREAS

LAND UTILIZATION

Practically all of the estimated cultivated acreage in China is used to produce human food or to grow fiber for clothing. In contrast with the United States there is practically no cultivable land in China used for pasture or hay or used directly for producing feed for livestock. The Chinese have learned that, for their country, it is more economical to grow crops for human food than to produce feed for livestock and consume meat.

Cultivated land is cropped more heavily in China than in most countries of Europe or America. Approximately 50 percent of the land is double-cropped, and some in South China produces three crops in 1 year. The fact that winter wheat is harvested in most sections by June 1 makes it possible to grow a second crop over a wide area.

Cultivated land in China not only must produce food and clothing material for more than 425 million people; it must also furnish fuel for a large percentage of the farm population in the form of stalks and straw. On the plains of North China, where very little grass and few trees are available, the problem of producing fuel from the land is vitally important, since it is required for cooking food as well as for heating the houses during winter months.

CROPPING AREAS

The cropping areas of China can, in general, be divided into two regions, namely rice and wheat, with the Yangtze River, roughly, as the defined boundary line. Rice is the outstanding crop south of the river, and wheat is the most important crop grown to the north. Some wheat, however, is grown in every Province south of the Yangtze and some rice in every Province north of it. Within these two regions many other important crops are produced. A division of the agricultural areas in China is given in figure 9. This division is the result of a comprehensive survey conducted under the auspices of the University of Nanking and the Institute of Pacific Relations.

In South China the *Double Cropping Rice Area* has a relatively small percentage of cultivable land, but, on the other hand, has some of the most intensive farming in China. Two complete rice crops are produced on the same piece of land each year, and many places produce a winter crop in addition. A large part of the rice land in this area, however, is left fallow during the winter. Most Chinese farmers believe that they can obtain greater returns by applying their fertilizer resources to rice crops during the summer than by using them on winter crops. A small part of the rice land (a greater percentage where population is denser) is used during the winter for growing vegetables, wheat, barley, beans, and peas. Sugar cane, although a minor crop in China, is grown most extensively in this area and competes in some districts with rice for the use of the land.

On the upland, or dry land, where it is not possible to grow rice, a number of crops are grown. In summer the principal crops are sweet potatoes, peanuts, and soybeans. Some corn and millet are grown in the sections of higher altitude. Tobacco is also grown in some districts, mostly on the upland and in some localities on semilowland. In many sections farmers have only upland and no land suitable for rice production. These farmers have a much larger percentage of their land in winter crops, such as wheat, barley, broadbeans, peas, and rapeseed.

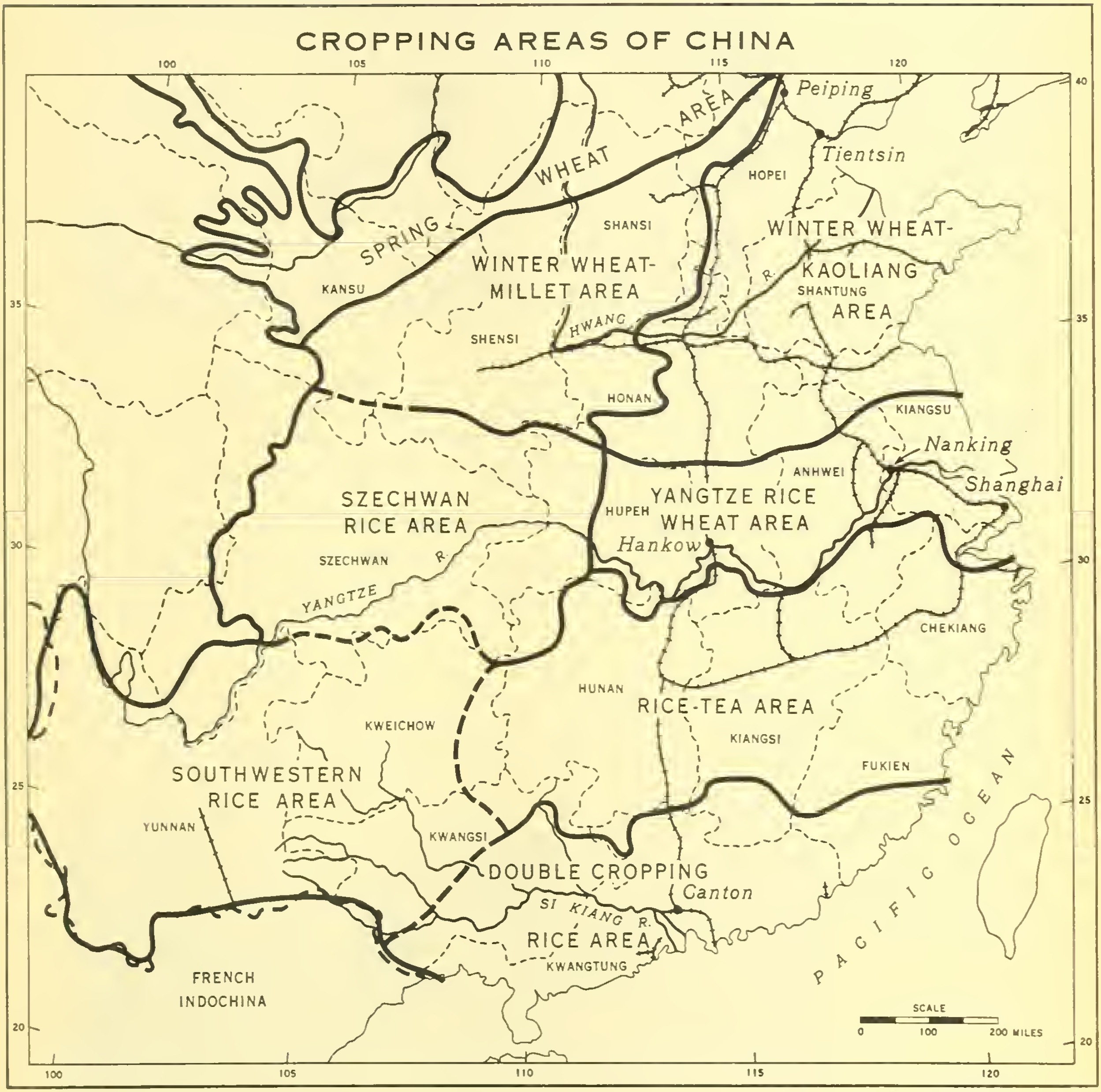

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Fig. 9.

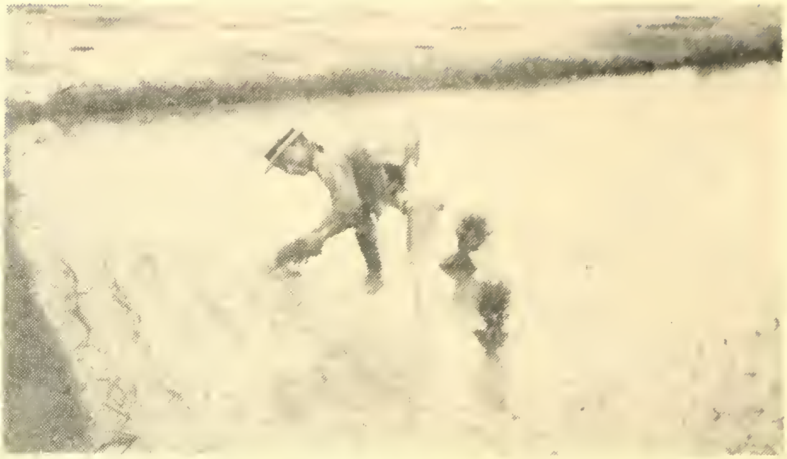

Fig. 10. Transplanting young rice plants from the seedbed to the field. The Chinese farmer puts from two to four plants per hill and takes pride in having straight rows, as the American farmer does with his corn.

In this area subtropical fruit and mulberry trees for silk production are important. The principal fruits grown are oranges, pomeloes, lychee *(Litchi chinensis)*, lungan *(Euphoria longana)*, persimmons, and bananas. Other fruits of less importance are mangoes, peaches, kumquats, pomegranates, and pineapples.

In the *Rice-Tea Area* are found a few level sections, but the larger part is mountainous. The level sections are intensively cultivated, with rice the principal crop grown. In the mountains of all four Provinces in this area, rather extensive plantings of tea are found, collectively owned by several farmers of a village or group of villages.

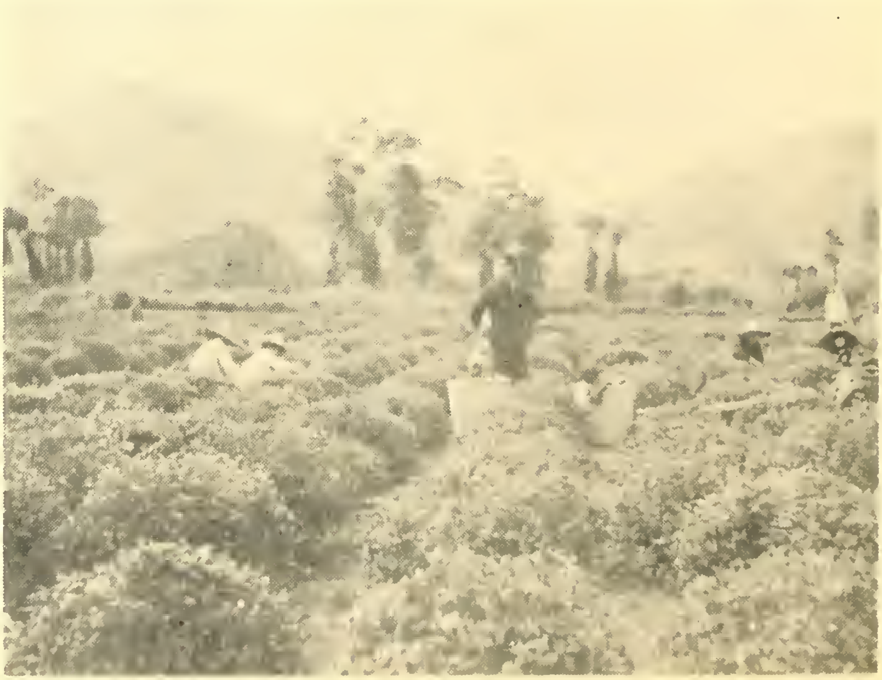

Fig. 11. Picking tea leaves on the hills of Chekiang Province.

Between the level, intensively cultivated rice sections and the mountainous areas are found several different combinations of the two types of farming. Wherever water and level land are available, rice farming is usually practiced, even on the mountainsides. Terrace farming is general in all three of the southern crop areas.

The most common rice farming in this area results in what might be called one and one-half crops off the same land, or interplanted early and late rice. The early crop is planted, during April or May, in rows a little farther apart than usual. In June the late crop is put in between the rows. In August the first crop is harvested when the late crop is already half grown. Just one crop for the season is also common in the area, while in a few localities two complete rice crops are produced.

Winter cropping is much more extensive in this area, especially along the northern quarter, than in the Double Cropping Area. Wheat, barley, broadbeans, and, in some districts, rapeseed are the principal winter commodities raised. These crops are produced on both rice land and upland.

In some districts of this area, cotton, tobacco, and sugar cane are grown. Fruit production is much less important, although along the coast oranges and peaches are grown commercially. Tung oil is produced in some districts of this area but is not so important as in some other parts of China.

The *Southwestern Rice Area* has the smallest amount of cultivated land of any important area of China. Yunnan and Kweichow, the two principal Provinces in the area, have an estimated amount of cultivated land of 4.7 and 8.3 percent, respectively. Rice is the most profitable crop that can be raised and is grown wherever water and land are available. Most of the rice produced in this area is from one crop during the summer. The average altitude is higher than for other crop areas in China; and, as a result, more temperate-climate crops are produced at this latitude.

After rice, the most important s mmer crop is corn, followed by soybeans, millet, kaoliang, peanuts, tobacco, sweet potatoes, and a small amount of cotton. While fruits are produced in this area, they are commercially unimportant. Tung oil is produced in Kweichow and in Kwangsi, where it is one of the most important cash crops. Opium was formerly grown quite extensively but has recently been prohibited.

The *Yangtze Rice and Wheat Area* is one of the most productive in China because of the higher percentage of cultivable land than in the areas of the south and the more favorable climatic conditions than in the cropping areas of the north. Two crops per year are produced on the same land in most of the districts. A large portion of the coastal Province, Kiangsu, has been formed by deposits of the Yangtze River and therefore has a considerable amount of level cultivable land. It is estimated that more than 30 percent of the area of Kiangsu is cultivated land while Anhwei and Hupeh each have more than 20 percent cultivated.

This area is important for both wheat and rice production, the northern boundary representing the northern limit for major rice production and the southern boundary representing the southern limit for major wheat production. While rice and wheat do not compete to any great extent for the use of land, nevertheless rice is considered the major crop. Chinese farmers believe it more profitable to use more of their fertilizer resources for rice production than for wheat. After rice, the important summer crops in this area are soybeans, cotton, and sweet potatoes. After wheat, the important winter crops are barley, broadbeans, and rapeseed. Mulberry trees are important in the Hangchow and Wusih districts.

The *Szechwan Rice Area* has wide variations in climate from subtropical to temperate, and in crops from sugar cane and rice to corn and millet. It is estimated that only 16 percent of Szechwan Province is cultivated and the parts of the other Provinces included in this area have an even smaller percentage of cultivated land. The Chengtu Plain comprises the important cultivated section and is the part most densely populated.

Rice is the outstanding crop, being grown wherever water and suitable land are available, and in some districts occupies more than 80 percent of the cultivated land. While most of the rice production is confined to the plains and valleys, terraced rice fields are found, where water is available for irrigation, almost to the top of many of the low mountain ranges. Other important summer crops are corn, sweet potatoes, peanuts, and kaoliang. Cotton, millet, and tobacco are common crops in some districts.

About 50 percent of the land in this area is used for winter crops, of which rapeseed and broadbeans are the principal ones. Poppies for many years were a common winter crop, but recently the Government has prohibited their production. In the eastern part of this area is located the most important tung-oil-producing section in China. With the reduction of opium acreage, tung oil became the most important cash crop exported from the area.

Because of its high percentage of cultivable land, the *Winter Wheat and Kaoliang Area* is an important agricultural section, having an average of 48 percent under cultivation for the three principal Provinces. Uncertain and uneven distribution of rainfall is the most important factor limiting the amount of production in this area. Winter wheat is considered the principal crop of the area and occupies about 45 percent of the cultivated land. No other winter crop is planted to any extent, although barley and peas are grown in a few districts.

A wide variation of summer crops is grown, of which kaoliang is the most important. This crop is well adapted to the climate and produces a large amount of grain and stalks for human food and fuel. Soybeans are very extensively grown, usually as a separate crop, but in some areas are commonly interplanted with kaoliang, millet, and corn. Millet is considered the third most extensively grown crop in the area and is followed by corn and sweet potatoes. In several districts cotton ranks next to kaoliang and beans in importance. Peanuts are also important in many districts, especially in Shantung and Honan, and flue-cured tobacco is grown in a few localities.

Fruits and walnuts are extensively grown in the area. A native pear is the most widely grown and represents the greatest cash income from any fruit in North China. Walnuts, apricots, persimmons, and apples follow in importance.

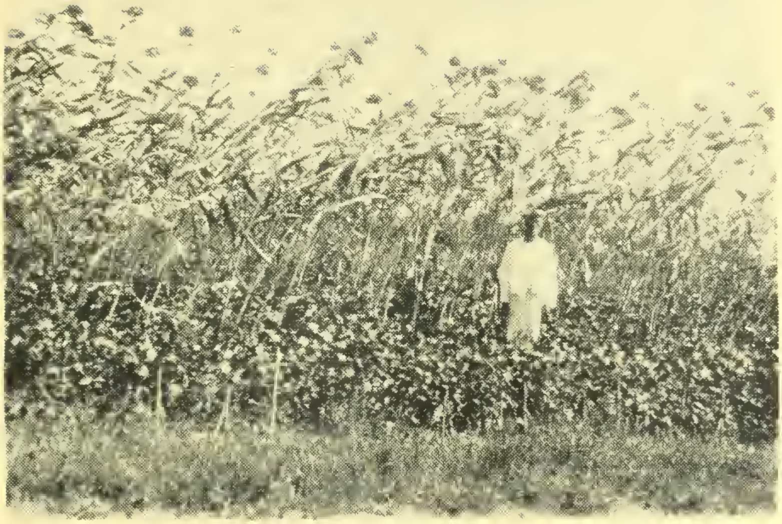

Fig. 12. Intercropping of kaoliang and soybeans in North China.

The *Winter Wheat and Millet Area* is estimated to have 18 percent of its land under cultivation. The best agricultural districts are along the Yellow River in southern Shansi and northern Honan, extending west into Shensi. The remainder of the area is quite mountainous, and crop production is mostly restricted to small valleys. This area is noted for the extensive loess soil deposits, which are productive when rainfall is sufficient.

Winter wheat is the most important crop, being planted on as much as 75 percent of the cultivated land in some districts and on an average of about 40 percent for the area as a whole. Other winter crops, of only minor importance but extensively planted in some localities, are rapeseed, peas, and barley. Millet is the most widely grown summer crop, followed by corn, kaoliang, soybeans, sesamum, and buckwheat, with cotton important in some of the better agricultural districts.

The *Spring Wheat Area* has a colder climate and a very limited amount of rainfall. The percentage of cultivable land is small, and some of it is left for grazing because of the shortage of rainfall. Spring wheat is the principal crop, with millet, oats, peas, flax, and buckwheat following in the order named.

ECONOMIC FACTORS AFFECTING AGRICULTURE

In early times, the Chinese raised crops that furnished them all the necessities of life. As population increased and some degree of specialization of labor developed, it became necessary for those on the land to produce a surplus. Such economic factors as markets, transportation, prices, and availability of land thus began to play an important role in agricultural production.

DENSITY OF POPULATION

The density of population and the amount of available land on which to produce food are problems of national importance in every country. As heretofore pointed out, the density of population in China per square mile of total area is less than in some European countries; but, when it comes to density per acre of cultivated land, we find the average to be 2½ inhabitants per acre, and in some districts as high as 10 inhabitants per acre. This undoubtedly is as dense as in any part of the world.

The density of population results in intensive farming, and the production of sufficient food is a paramount problem for the rural people as well as for the country as a whole. With normal crop production in all sections of the country, undoubtedly everyone in China would have plenty of food. The average farmer, however, has insufficient reserve food supply or funds to withstand a serious drought or flood. Because of the topography of the land and the smallness of the farms, few farmers are fortunate enough to have both lowland and highland to insure them a food supply in either a dry or a wet year.

In considering the density of population in relation to agriculture, three problems need to be examined:

(1) Has the population of China reached its maximum?

It is believed that in some sections the population in the past has been larger than it is now. Famines, wars, and pestilence have been effective in holding down population. With an improved Government, the death rate from famines and wars would be reduced and it is believed that, as a result, the rural population would increase.

(2) Is it possible for China to support a larger population on the present amount of cultivated land?

Japan offers a noteworthy example of what can be done in supporting a larger population by means of improvements in agriculture. The principal factors that have increased production in Japan have been improved seeds, increased use of fertilizers, better irrigation, and improved marketing. In Japan Proper, rice production has increased from 361 million bushels for the 10-year average 1891-1900, to 571 million bushels for the 5-year average 1933-1937. It is believed that with political stability China would be able similarly to increase food production from the present cultivated acreage. The increase undoubtedly would be slow, and the percentage might not be so great as in Japan, since rainfall is more uncertain in wide areas of China.

(3) Can China reduce the density of population by bringing more land into cultivation?

It is possible for China to increase the cultivated acreage by a small percentage (see page 442), and with improved transportation and more settled political conditions some Chinese farmers would migrate farther into the northwest.

With improved health and sanitary conditions and increased crop yields, it is believed that the density of population would increase rather than decline. The increase in the amount of land available would thus not be sufficient to prevent a further increase in the density, which, in turn, would prevent any improvement in the standard of living.

SIZE OF FARMS AND THE FARM ENTERPRISE

Closely associated with the density of population is the size of farms and of the farm enterprise. According to a survey made in northern and central China, the average farm is about 5 acres.[7] Farms in southern China, especially in the rice-producing sections, average much smaller.

There are many reasons for the origin and continuance of small farms in China. Undoubtedly one of the most important is the fact that there were no markets for surplus production during the period of early settlement. At that time it was necessary to raise only sufficient food for the family. Population increased, and before domestic or foreign markets were available most of the cultivated land was already in use. In recent years there has been some improvement in transportation and markets are more accessible, but the profits from surplus production have not been sufficient to revolutionize farming practices. High land taxes and lack of capital have handicapped farmers in enlarging their farms even when they were producing a profitable commodity for the market.

Table 4. Average crop area in various crops on farms, North China and east-central China

CROP	NORTH CHINA AVERAGE FOR 1,615 FARMS	EAST-CENTRAL CHINA AVERAGE FOR 1.251 FARMS
	Acres	*Acres*
Wheat	2.39	1.50
Rice	.21	2.95
Soybeans	1.40	.30
Kaoliang	1.26	a
Millet	1.08	a
Barley	.40	.20
Sweet potatoes	.20	.20
Field peas	.20	.20
Sesamum	.15	.02
Corn	.20	.03
Corn and soybeans	.14	.08
Rapeseed	.01	.20
Cotton	.04	.05
Hemp	.04	a
Others	1.96	.54
Total	9.68	6.27

[a] Less than 0.01 percent. Derived from J. Lossing Buck's *Chinese Farm Economy*, 1930, p 184. The average size of farm in North China was 7.85 acres and in east-central China, [illegible] acres. The cropping area is larger than the farm as the result of double cropping.

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[7] Buck, J. Lossing, *Chinese Farm Economy*, The Commercial Press, Ltd., Shanghai, 1930, p. 44.

Large-scale farming, which would require buying a large amount of equipment and hiring labor, would be unable to compete with the family farms, where the labor costs are very low.

The Chinese farmer, in addition to cropping his land, has other enterprises that bring in some cash return. Most farmers raise a few chickens, ducks, or pigs, and, in some sections, goats or sheep. In some areas many farm homes have looms for weaving cloth, which makes use of the family labor during spare time. The cash expenditures for these enterprises are small and the returns are meager. No farmer engages in large-scale chicken or hog production, since it would necessitate his buying feed and competing with farmers who raise their few head of stock on farm byproducts and have an exceedingly low cost of production.

The average cash income per farm is very small. In North China wheat is the most common cash crop, of which the farmer may sell from 10 to 70 percent of his harvest. Peanuts, cotton, and tobacco are largely cash crops, but, as noted in table 4, these commodities on an average represent very small acreages. The other general crops produced are practically all required for home consumption.

The farm earnings (total cash income, including value of the farm products used by the family minus cash expenses and charges for unpaid family labor) in North and central China during the period 1921-1925 averaged $126, United States currency, per farm.[8] This amount represented the operator's total income for his labor and the income for the farm. If the operator was a tenant, the rent was subtracted from the above income.

The lack of credit at reasonable rates of interest is a decided handicap to Chinese farming, since, when the average farmer finds farming profitable, he usually has difficulty expanding his business. If he is not in debt, his reserve capital is small and it is difficult for him to borrow money at reasonable rates. With regard to rice production, the returns from the crop are usually profitable; but in some sections of the country the farmer is not able to put all of his land in rice because of the high cost of production.

It is very hard for a tenant farmer to become an owner. If a farmer does not have at hand sufficient capital to buy his land, he usually does not make the purchase. If he borrows money, the interest charges are so high that he finds it difficult to pay them and therefore has little hope of ever reducing the debt.

TENANCY IS LOW AND RENTS ARE HIGH

Tenant farming in China is widespread, although not so prevalent as in many countries. Several surveys have been made as to the extent of tenant farming, and the results of each show that tenancy is highest in rice-farming areas and lowest in the wheat region. These surveys reveal that south of the Yangtze River and in South China about one-third of the farm operators are tenants, one-third are part owners, and one-third are owners. In North China less than 15 percent of the farmers are tenants, less than 15 percent are part owners, and over 70 percent are owners.

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[8] Calculated from J. Lossing Buck's *Chinese Farm Economy*, Shanghai, 1930, p. 110.

In China, as in many other agricultural countries, tenancy is most widespread on productive land. In the south the more favorable climate and the larger percentage of the cropland on alluvial deposit make it possible for the tenant and the landlord each to receive sufficient returns to obtain a living from the land. In North China the shorter growing season and the uncertain rainfall result in a much smaller return per unit of cropland.

Table 5. Farm operators in China and the United States, by form of ownership

COUNTRY	OWNERS	PART OWNERS	TENANTS
	Percent	*Percent*	*Percent*
China[a]	54.2	28.9	[b] 16.9
United States[c]	47.1	10.1	42.8

[a] Buck, J. Lossing, *Land Utilization in China*, farm survey data, 1937, III : 57.

[b] About 65 percent of the group live in their own homes, but rent all of the cropland.

[c] Based on United States census, 1935.

Variations in types of rent in China are about as great as in the United States. Cash-crop or standing rent, under which the tenant gives a definite amount of measured grain per acre each year, is the most common. According to the land utilization study made by J. Lossing Buck, over 50 percent of the rents were of this type, whereas actual cash rent represented 25 percent and sharecrop rent 22 percent.

The amount of rent the Chinese farmer must pay varies according to the region and the type of renting system, but in general the rates are considered high. The share of the total crop income given to the owner ranges from 25 to 66 percent,[9] depending upon what the landlord furnishes. The highest rates are usually paid by the tenant when he furnishes only the labor and the landlord furnishes seed and fertilizer. The actual cash and cash-crop types of rent are based on expected average yields. Because of irregular production, this system frequently results in the tenant's paying a relatively high rate. The sharecrop rent in China is usually based on a fifty-fifty division of the crop.

TRANSPORTATION FACILITIES INSUFFICIENT

Commercial agriculture has been slow in developing because of the lack of transportation. Today it is only partially developed, for present facilities are still inadequate for agricultural needs.

In many sections of the country, transporting goods on people's backs is still the most common method of moving agricultural products. It was estimated some years ago that in the interior and western part of the country two-thirds of the goods was carried by human labor.[10] Even today a large proportion of the commodities transported are still being so carried. Investigations have shown that, in spite of low wages, transporting goods any great distance entirely by human labor is very expensive and uneconomical.

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[9] *Ibid.*, p. 148.

Steamships and railways are now carrying the greater part of Chinese goods along the coasts, on the principal rivers, and over the 7,000 miles of railways. In North China, carts divide the work of transportation with railways; and, in the northwest, carts and camels furnish the chief means of transportation. But throughout the central, southern, and western regions of China, human labor transports most of the goods, either by carrying or by propelling boats, while along the South China coast steamships and sailing vessels are used.

Aside from human labor, water transportation was the first to be developed and is still the most important method of marketing Chinese products, especially in the Yangtze Valley. Chinese history records that canals were constructed as early as 540 B. C.[11] The Grand Canal, formerly known as the Great National Waterway, which runs from Peiping to Hangchow and is about 1,000 miles in length, was completed about 1300 A. D.[12] One of the principal reasons the Government had for constructing canals was to bring tribute to the Emperor. Upon completion of the Grand Canal, large quantities of rice each year were brought to the capital. It was recognized that the cost of transportation was greatly reduced. After a few years, the traffic on the Grand Canal became so heavy that the Government ordered 60 seagoing vessels to run from the mouth of the Yangtze via Tientsin to Peiping.

Chinese sailing vessels visited India about the fourth century. During the sixteenth century, European sailing vessels began regular trips to China. In the nineteenth century, Europeans brought steamships to China, and today they are used a great deal along the China coast and on the Yangtze River.

Chinese history speaks of highways in early times that radiated from the capital to all the important cities in the Empire, and records indicate they extended to India and Europe. Though these long roads were called highways, most of them were undoubtedly only improved footpaths. Transportation of goods over them was carried on by human labor, pack mules, and donkeys. Camel caravans, commonly used for many centuries in northwest China, were probably used in transporting goods to Europe in the early centuries.

In North China two-wheeled carts have long been used. These carts at the present time are used both by farmers and by men engaged in commercial transportation of agricultural produce. Many a farmer with an ox for field work also uses the same animal to draw a cart in hauling crops from the field and in transporting goods to market. The cart men engaged in commercial transportation usually use horses or mules. At the present time, carts are known to be used for transporting goods as far as 100 miles from the producing area to the central market.

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[10] Bashford, James W., *China: An Interpretation*, The Abingdon Press, New York, 1919, p. 83.

[11] Tang, C. Y., *An Economic Study of Chinese Agriculture*, 1924, p. .

[12] *Ibid.*, p. 183.

[13] *Ibid.*, p. 184.

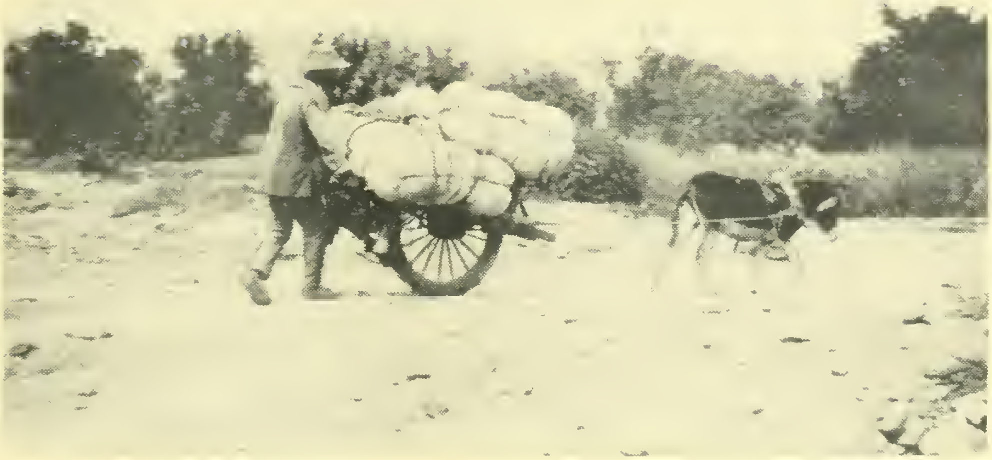


Fig. 13. Marketing cotton in North China where railways and waterways do not exist. Note native bales.

Roads suitable for motor traffic have been very slow in developing and the present mileage is very small in relation to the area of the country. In 1922, an estimate of total mileage was 500 miles of improved city streets and roads and 1,200 miles of passable dirt roads in the rural districts.

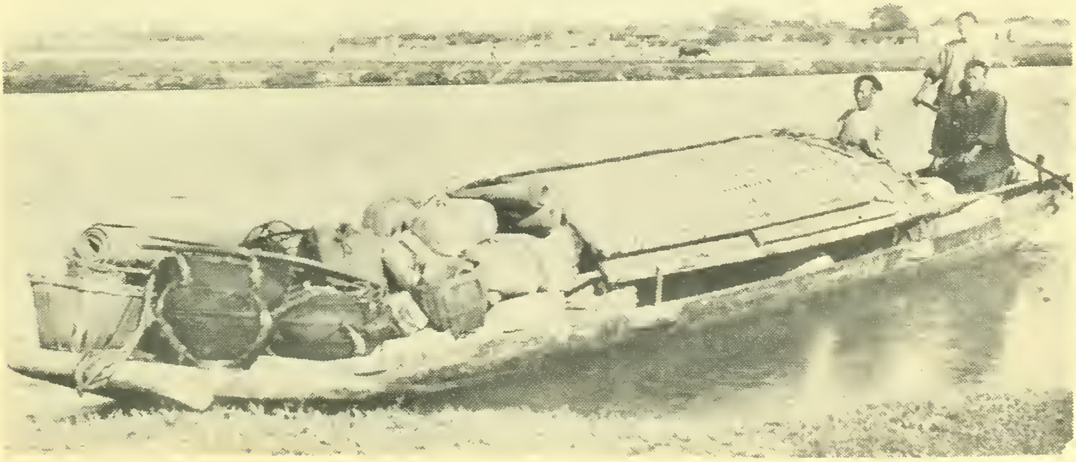


Fig. 14. A canal boat in Fukien Province. Boat transportation for all farm commodities is widespread in the Yangtze valley and South China.

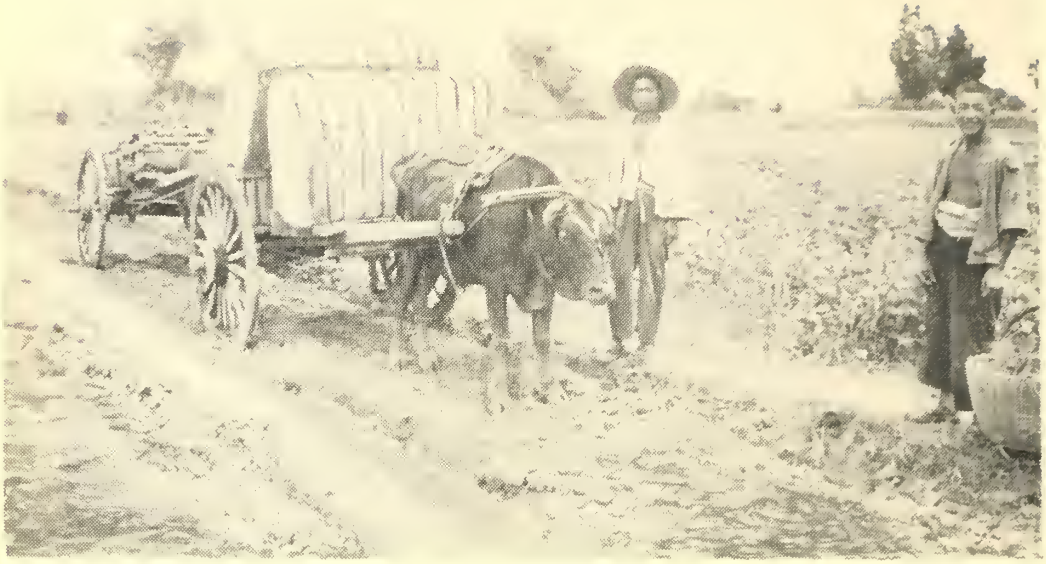
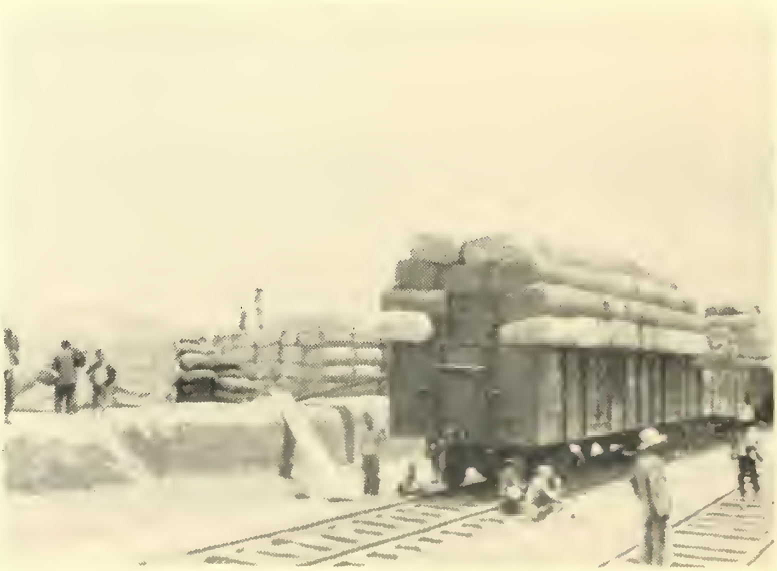


Fig. 15. Transportation in Shensi Province. Raw cotton on the first cart and coal on the second cart.

Since 1930, motor roads have been built very rapidly. The motor-road mileage by the end of 1936 was estimated at 65,000 miles. The amount of agricultural goods being transported by motor truck on these new highways is small because of the high cost compared with the value of the goods and with the lower cost of water transportation.

Fig. 16. Cotton in western Honan Province ready for transportation to a central market.



Railway development in China has been slow and irregular. The first line, 12 miles in length, was built by a foreign company from Shanghai to Woosung in 1876. Due to Chinese opposition, this line a few years later was torn up by the Government and shipped to Formosa. From 1880 to 1894, Chinese leaders began to realize the need of railways and a few short lines were built. From 1895 to 1911 the Chinese Government, independently and with the aid of foreign loans, built several railways. From then on for over 20 years very little progress was made in building new lines; but, beginning with 1935, railway development has been stressed by the Chinese Government and several new lines have been completed and others begun. The latest estimate gives about 7,000 miles of railroads for China, which compares with 238,539 miles in continental United States.

The cost of transporting agricultural goods in China is very high in comparison with other costs and with the standard of living. Statistics on the cost of transportation are entirely lacking, but transporting goods on the backs of laborers is estimated at from 20 to 40 cents per ton-mile. Motor truck transportation is high because of the excessive cost of the truck and the fuel oil in comparison with other native prices. Rail transportation in China was expensive for many years because of inefficient operation. During the past few years, rail freight rates have been lowered and the amount of goods transported by railways greatly increased. Boat-transportation costs vary considerably. Small rowboats and sailboats on canals and rivers are quite economical for short distances; river and coast steamship rates are also considered reasonable.

AGRICULTURAL MARKETS

The markets available for surplus farm products have considerable influence upon the quantities and types of agricultural commodities produced. Markets in China for surplus production have been slow in developing because of the lack of transportation. Local markets are the most important to the Chinese farmer, whether his commodity for sale is for local use or for the central or foreign market. The farmer sells his goods on the local market by several different methods. In some sections there are market places where the farmer brings his goods and retails them. In other sections he sells to the local merchant or a wholesale dealer. Commodities for the central and foreign markets are bought by middlemen, who are sometimes local merchants but frequently are men who have no other business.

Between local and central markets, commodities are often handled by many middlemen, each moving the commodity along toward the central market and usually increasing the volume of goods. In general, commodities are not graded or standardized. The middlemen are often guilty of adulterating commodities in order to increase their profit. In a few sections of the country, cooperative-marketing associations have been started and in some localities have been quite successful in eliminating middlemen.

Central markets in China are considered to be those in which a considerable surplus of agricultural products is bought and sold. Canton and Foochow were central markets for silk and tea several centuries ago. Today there are many central markets in China, the number varying with the commodity. For example, the central markets for cotton are Shanghai, Tientsin, Hankow, Chengchow, and Tsinan.

When agricultural goods reach the central market, instead of being sold by grades, they are usually sold by the name of the locality in which they are produced. Each locality is known to produce a certain quality.

The Chinese Government in 1929 began establishing Testing and Inspection Bureaus at important central markets. The work of these Bureaus has gradually improved the quality of some commodities.

Foreign markets for Chinese agricultural produce really began in the sixteenth century when Portuguese and Spanish sailing vessels came to China for tea and silk. Foreign markets for these commodities were developed in Europe and later in America. The demand for Chinese tea and silk in foreign markets, however, affected only a relatively small percentage of the farmers.

Foreign markets for other Chinese commodities did not develop to any extent until after 1890. Japan then became an important market for raw materials, such as raw cotton, wool, and vegetable oilseeds. After 1900, foreign markets were opened for many other agricultural products, such as hides and skins, eggs and egg products, wood oil, peanuts, and sesamum seed.

Most Chinese agricultural goods shipped to foreign markets are bought in central Chinese markets by foreign firms, who do the exporting. Most of the exports made by Chinese firms are to Chinese in other countries and are largely limited to the Malay States and the Philippine Islands.

FARM PRICES

The prices that Chinese farmers receive for their surplus production is an important factor in determining the type and the amount of goods produced. It is believed that Chinese farmers react to changing prices in adjusting their production in much the same way as farmers do in other lands. Adjustments are greatest for those crops of high cost of production, such as rice, flue-cured tobacco, and cotton. The Chinese farmer's paramount interest is producing food for his family. But when prices for cotton, tobacco, and silk are high, he increases the production of these commodities. If his food production is insufficient for his family, he purchases the deficit from the local market. When food crops are high in relation to the other crops, however, he turns to the production of millet, wheat, rice, and other food crops.

As prices are usually quoted in the currency used within the country, the kind and value of this currency has its importance. China's currency system for several decades lacked uniformity and stability, largely because of the fact that the country did not have a strong central government. The monetary problems in China have been (1) lack of a national standardization of weights and measures; (2) use of silver and copper systems side by side, with each varying in relative value; (3) debasement of the currency by dishonest officials; (4) issuance of paper currency by Provincial governments and private individuals without sufficient security; and (5) inability completely to stamp out counterfeiting.

During recent years the currency in common use has been silver dollars, paper notes, and copper coins. Silver was the basis of the Chinese currency until November 1935, when the Government adopted a managed-currency system.

From 1934 to 1937, the Government made rapid progress toward establishing a uniform national currency system. The central Government bank notes were accepted at par in practically all parts of the country. This new uniform currency was beneficial in improving agricultural trade and bringing about more stability for agricultural prices. The value of Chinese currency compared with other foreign currencies has a direct influence upon those commodities that enter international trade and this, in turn, affects the prices of other commodities within the country. From 1930 to 1932, agricultural prices in China declined only slightly, compared with the sharp fall in world prices. This was the result of the decrease in value of silver, which declined approximately as much as world agricultural prices.

Agricultural prices fluctuate in China just as widely as in any other country. For example, wholesale rice prices at Shanghai for July 1930 averaged 10.5 cents, Chinese currency, per pound and in July 1933 averaged 4.5 cents. Other factors in addition to the value of the currency, of course, influenced this change in price.

The domestic supply of most commodities in China has a very direct influence upon the market price. The effects of local demand and supply have been greater in China because of the lack of efficient transportation. This is illustrated by the fact that a few years ago one Province could have a famine while a neighboring Province was experiencing overproduction. Under a strong Government and with improved transportation, the effects of local food shortages or overproduction would be much less severe and the extreme fluctuations in agricultural prices would be greatly lessened.

World prices have some effect on those Chinese commodities that are exported or imported, such as wheat, cotton, flue-cured tobacco, silk, wood oil, and peanuts. World cotton prices, in fact, are of considerable importance in the determination of Chinese cotton prices. Chinese cotton markets 600 miles interior from Shanghai receive hourly radio reports from the Shanghai Cotton Exchange, which, in turn, receives daily reports from the Bombay and New York Cotton Exchanges. Prices of no other Chinese commodity, however, are so greatly influenced by conditions on the world market.

CREDIT

Credit is essential to farmers with small holdings and to those who have incomes insufficient to permit an accumulation of savings. While money lenders are found in nearly every district, the interest charges are usually prohibitive for financing agricultural production.

The necessity for an improvement in agricultural credit in China has been realized for some time. The Government functioning in 1915 passed a measure for the creation of agricultural credit banks. Some Provincial agricultural banks were organized but until recently took little interest in the farmer's need for credit.

This lack of interest was partially due to unstable political conditions. In 1923, however, the International Famine Relief Commission began to organize cooperative agricultural credit societies, and by 1932 the leading Chinese banks and the Government had begun to foster similar organizations.

The need for cheaper credit is indicated by the demand and tremendous growth of these organizations. By the end of 1935, there were 15,249 cooperative credit societies, with a membership of 426,000, registered with the Government. In addition, there were 4,374 general cooperative societies, with 212,636 members, whose principal function was credit.[14]

The two greatest needs for credit among Chinese farmers are for (1) agricultural production and (2) maintenance of social customs. Production credit is needed principally in connection with the high-cost crops, such as rice and flue-cured tobacco, where the purchase of fertilizer is often necessary.

With respect to social customs, credit is needed principally for weddings and funerals. Social custom dictates that large weddings and funerals are necessary to maintain family prestige. Rural families have often gone into debt for a generation for such occasions. Most of the new cooperative credit societies have regulations prohibiting loans for these purposes.

The rapid expansion of credit societies was an indication of the need for credit at reasonable rates. The interest the farmer has had to pay has varied from 18 to 80 percent per year, with 30 percent a common rate. Kind-hearted rich men of the community and sometimes local banks make loans for as low as 18 percent, or 1.5 percent per month. Professional money lenders and pawn shops charge the farmer from 3 to 5 percent per month. Through the new cooperative credit societies the farmer secures necessary funds at an average rate of about 12 percent per annum. If the new cooperative credit societies are successful, they will undoubtedly tend to increase agricultural production.

TAXATION

High taxation of agricultural land has been a heavy burden for the Chinese farmer and has had its influence upon production. In many sections of the country during the latter half of the period from 1911 to 1930, farmers were very heavily taxed by the various military rulers, many of whom were in control for only a few months. As example of the effect on agricultural production, farmers in several sections of the country were forced to plant poppies in order to pay the opium taxes instead of using their land and resources for production of food crops.

Many illegal taxes were collected in addition to heavy land taxes. Tax stations were set up along highways, waterways, and railways to collect taxes on the movement of agricultural goods. These stations were so numerous that farmers were able to move their produce through only two or three districts before the amount paid in taxes became greater than the value of their goods. Various Provincial governments commonly collected taxes upon exports of foodstuffs under the pretext of preventing food shortages, and some Provinces applied import taxes on goods coming into the Province on the grounds of maintaining farm prices.

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[14] *Crop Report*, Chinese National Agricultural Research Bureau, February 15, 1936, p. 38.

During the past few years rural taxation has become more systematized, and taxes have been reduced or omitted in sections during years of poor harvests. Reports indicate, however, that in many parts of the country taxes are still excessive.

TARIFF

Chinese import tariff rates on agricultural commodities were very low from 1848, when China entered into trade treaties with foreign powers, until recent years. The rates set in these early trade treaties could not be changed without the approval of the foreign countries. In 1922, a revision was approved that increased the rates on many commodities. In 1929, China was given tariff autonomy by the signatories of the early trade treaties. From that year to the end of 1933, China rapidly increased the rates on practically all imported articles. There were very few changes from 1933 to 1937.

While the 1937 import tariff rates were not high compared with those of some European countries, according to oriental standards they were quite high on many commodities. The rates on wheat, rice, cotton, and tobacco encouraged increased production of these crops and were reducing import requirements. The rate on sugar, in spite of considerable smuggling, was also increasing the production of sugar cane.

Table 6. Chinese import duties on specified commodities, 1922 and 1936

COMMODITY	UNIT	1922	1936
		United States cents	*United States cents*
Wheat	Bushel	Free	9.14
Wheat flour	100 pounds	Free	37.80
Rice	Pound	Free	0.59
Raw cotton	Pound	0.50	1.52
Leaf tobacco-			
Low grade	Pound	0.93	2.10
High grade	Pound	2.49	7.00
Sugar (refined, white)	Pound	0.20	2.92

Publications of the Chinese Maritime Customs.

POLITICAL FACTORS AFFECTING AGRICULTURE

Early Chinese history reveals that the farmer was held in high social regard, ranking next to the scholar. The fact that the Chinese Emperor for many centuries went each year to the field and plowed a furrow indicates that the Government was interested in agriculture. It is believed that the Chinese farmer fared well during early times. Taxes were commonly paid in kind. Chinese history frequently mentions tribute grain, silk, tea, and livestock that were sent to the Emperor. The Government supervised the construction of canals and dykes for irrigation and flood control.

During the nineteenth century, when western nations began to make rapid improvements in the field of agriculture, Chinese isolation and lack of interest in western civilization prevented any reflection of this progress in China. At the beginning of the twentieth century, the last Minister of Agriculture under the Imperial Government, Chan Chien, was very active and started several enterprises for the benefit of agriculture. He began several experiment stations, a cotton-textile school, and other agricultural schools, improved canal and road transportation, and initiated other enterprises for the benefit of agriculture.

From the overthrow of the Imperial Government in 1911 until 1930, during which period China had little or no central organized government and was ruled by numerous war lords and subjected to frequent civil wars, the country degenerated considerably from an agricultural standpoint. While undoubtedly some of the military leaders were interested in agricultural improvement, most of them controlled their areas for a relatively short time and had to spend all their effort in military defense. During this period the farmers' standard of living probably declined materially.

Disrupted transportation was a serious factor in depressing agriculture. With the frequent civil wars, railroads were often used primarily for military purposes or traffic was disrupted between producing areas and central markets. Agricultural produce often accumulated in the interior and brought very low prices, while port cities were unable to obtain food supplies except from abroad. What produce was able to reach central markets each year bore increased marketing costs. Military leaders had to have money to defend their areas or to increase their power, and taxation of the farmer was the principal source of revenue. Frequently the annual land tax was collected twice a year. Provincial export taxation on foodstuffs was a common method of increasing the tax burden of the farmer.

The high interest rates farmers had to pay were not caused by the Government, but rather by the lack of government. They had been high in China even during the time of the Empire. As rural economic conditions deteriorated during the 1911-1930 era, incomes declined and taxes increased, money became scarcer and risks higher, and interest rates consequently increased.

Flood control and irrigation systems, which need regular attention to benefit agriculture, were almost entirely neglected during these two decades of political turmoil. Government agricultural experiment stations and schools were given little support, with the result that they were poorly staffed and their accomplishments were almost negative.

Though the present central Government was organized in 1927, it was not until after 1930 that it became firmly established. It was necessary for the new Government to assume the heavy indebtedness of former Governments. With no organization or trained personnel for immediate improvement of the country, a tremendous burden was thus placed upon the new Government. The evils of the past were deep-rooted. Graft and corruption were widespread among minor officials. Floods had become more serious because of the lack of control work. The disastrous Yangtze River flood of 1931, combined with a major invasion, were forces that nearly broke the back of this struggling Government.

With the organization of the National Flood Relief Commission in the fall of 1931, funds, supplies, and credit were obtained on a large scale and the Government began to bring relief, build dykes, and render service to the people of the Yangtze Valley. This was a "new deal" for these people and a new policy for the Government. During the previous 20 years, the Government had meant to the rural people only an institution demanding continually greater taxes.

In the spring of 1931, the central Government began making surveys and studies looking toward improved rural economic conditions. In 1933, with the consummation of the American cotton and wheat loan, funds were made available for the establishment of the National Economic Council, which came into existence in November. This Council began work along several lines: (1) agricultural rehabilitation, (2) highway construction, (3) water conservation, and (4) public health. Under agricultural rehabilitation, such undertakings as cotton improvement and rural cooperatives were stressed. With improved transportation emphasized by the Government, highways developed rapidly. Existing railways, which were nearly obsolete in 1930, gradually improved and a number of new lines and extensions were built. The water-conservation program included flood prevention, irrigation, and reclamation.

The National Agricultural Research Bureau, which was organized in 1931 and began to function in 1933, was created for the purpose of improving crops and livestock and collecting agricultural information. A national agricultural experiment station was established and cooperated with several Provincial experiment stations, formerly comparatively inactive. Most of the experimental activities were well organized and the stations began to do creditable work. The efforts of Dr. H. H. Love of Cornell University were important in laying the foundation for this research work.

The Government Testing and Inspection Bureau, which was set up in 1929, has been considerably improved during recent years. This Bureau was organized to check the decline in some of China's exports by improving and standardizing such export products as silk, tea, tung oil, and raw cotton.

Rural cooperatives of various types have been in existence in China for many years. Government aid to cooperatives began in 1932 and was directed principally toward credit and marketing organizations. The leading Chinese banks furnished most of the funds. Loans were made to local cooperatives at from 8 to 12 percent interest, and these made loans to farmer members at from 10 to 14 percent.

Through Chinese membership in the League of Nations, China was furnished several experts along such lines as rural cooperatives, road building and transportation, sericulture, and finance. The new railways, with through traffic and lower freight rates, have been important factors in the improved marketing of agricultural products and represent one of the outstanding accomplishments of the central Government. The improved political conditions resulted in noticeable increases in agricultural output. During 1921-1935, annual rice imports averaged 1,100,000 short tons, while in 1936 imports totaled only 340,000 tons, the lowest since 1920. Wheat and flour imports during 1922-1935, in terms of wheat, averaged 30,200,000 bushels annually; in 1936 imports totaled only 5,800,000 bushels - also the lowest since 1920.

Many things, however, remain for the Government to undertake in improving agriculture and in alleviating the farmers' depressed situation, such as improvement of grain and livestock, establishment of grain standards, continuation of irrigation projects, addition to railways and improved waterways, development of improved economic methods of fertilization, and encouragement of small-scale rural industries. The central Government had made a worthy start by 1937 toward improving agriculture and increasing the rural buying power.

REQUIREMENTS IN AGRICULTURAL PRODUCTS

With 425 million people to feed and clothe, China's agricultural requirements are necessarily large. The acreage of cultivable land per capita is small and must produce fuel in the form of stalks and straw as well as food and clothing. Intensive farming is therefore a necessity, as is the use of all cultivated land for growing crops for human consumption.

FOOD REQUIREMENTS LARGE

The standard of living in China is low, and per-capita consumption of food is probably somewhat smaller than in most other countries.

Table 7. Percentage of the chief staple food products used for different purposes in China

FOOD PRODUCTS	HUMAN FOOD	ANIMAL FEED	SEED	OTHER USES[a]
	Percent	*Percent*	*Percent*	*Percent*
Rice	82	4	8	6
Wheat	74	5	11	10
Barley	42	33	10	15
Corn	66	19	9	6
Kaoliang	45	24	8	23
Millet	77	7	8	8
Oats	61	22	11	6
Sweet potatoes	53	34	5	8
Soybeans	51	25	10	14

Crop Reporting in China, National Agricultural Research Bureau, August 1936, table B, p. 59.

[a] A large percentage is used indirectly for food.

A large share of the family income in China is required for food. From a survey taken among the working people of Peiping it was found that the average family used 58.2 percent of its expenditures for food. A survey by Dr. J. Lossing Buck indicated that farm families average 58.9 percent of their expenditures for food. The average for some districts was over 75 percent, with the lowest group just under 50 percent.[15] In the United States, only from 25 to 35 percent of the family income is required for food.

The food used by the Chinese people depends upon the locality in which they live, for the diet has largely been adapted to the crop that can be most economically produced. The diet of the Chinese people includes a much larger proportion of grains than does that of western nations.

In North China, the principal foods are wheat, millet, kaoliang, sweet potatoes, and corn. Soybeans are also used quite generally in smaller quantities. In some sections of the northwest, Irish potatoes, introduced by the early missionaries, are commonly used in the diet. Wheat and millet are considered the higher-standard foods in the north, while kaoliang is a low-quality food. The consumption of vegetables is less than in other areas of the country because of the shorter producing season.

Table 8. Percentage of the chief food crops in the diet of the rural population of China

FOOD CROPS	NORTH CHINA	YANGTZE VALLEY	SOUTH CHINA
	Percent	*Percent*	*Percent*
Rice	2	40	60
Wheat	24	20	6
Barley	3	8	2
Corn	9	3	1
Kaoliang	13	5	1
Millet	17	2	1
Soybeans	6	4	5
Other beans	4	6	4
Field peas	2	3	1
Sweet potatoes	13	6	13
Buckwheat	4	1	1
Others	3	2	5
Total	100	100	100

Based on a survey of the Chinese National Agricultural Research Bureau. *Crop Reporting in China*, Nanking, August 1936, table A, p. 56. This table does not take into consideration vegetable oils, meats, and other miscellaneous items in the Chinese diet.

In South China rice is the outstanding item of diet. The next most common food is sweet potatoes, which are considered the poor man's food in much of the country. Sweet potatoes are used fresh during the autumn and are ordinarily dried for winter consumption. Soybeans are consumed largely in the form of bean curd and bean oil. Wheat flour, not an important item in the regular diet, is used for making noodles and for unsweetened cakes, which are served largely at restaurants or food stands along the streets for laborers. Steamed biscuits are commonly used at feasts. It is believed that the people of South China eat a larger amount of meat, vegetables, and fruit than those of North China. There are, however, no statistical data to prove this contention; but, owing to the continuous growing season, more vegetables, fruit, and livestock are produced in the south.

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[15] Buck, J. Lossing, *Chinese Farm Economy*, p. 385.

In the Yangtze Valley the diet of the people along the river and to the south is much the same as that of South China, while in the northern half of Kiangsu, Anhwei, and Hupeh Provinces the diet is very similar to that of North China people. There is, however, a belt just north of the river where there is a blending of the two types and possibly some shifting takes place, depending upon relative prices, between a rice diet and a wheat-millet diet.

Because of the very low per-capita consumption of meat and animal fats, the Chinese people might be considered vegetarians. The Buddhist religion, which forbids the eating of meat and animal fat, has a large following in China. This may have a slight influence on the consumption of meat; but it is believed that, if meat were cheap enough, the religious teaching would be less effective.

The principal animal-protein foods consumed by the Chinese are chicken, eggs, pork, and sea food, the last-mentioned along the seacoast and rivers. The first three are used in all sections of the country, while goat's meat, mutton, and beef are used to some extent in the areas in which they are produced.

More meat and animal fats are consumed in the cities where a larger percentage of the people have a higher standard of living. Country people use meat for feasts but only to a very limited extent in their daily diet. Dairy products are almost unknown in the country, and city people of means are just beginning to use them. In place of animal proteins the Chinese consume substantial quantities of vegetable-protein foods, such as soybeans and peanuts.

Vegetables and fruits are used in most sections, largely in the fresh state since canning of fruits and vegetables has not come into general practice. Drying of certain fruits and vegetables is common in some districts. Pickling of certain vegetables is quite general in most sections of the country. In North China cold storage, by storing in the ground, is a fairly common method of extending the period for the consumption of some fruits and vegetables.

Vegetables are next to cereals in importance in the diet of the majority of the people. Fruits in season are an important food only in the district in which they are grown. Sugar is not used in the regular diet of most of the rural people, although in the sugar-cane-producing areas a small quantity is consumed. City people with higher living standards consume the bulk of the sugar used in China.

HOUSING MATERIALS LARGELY FROM UNCULTIVATED LAND

The commonest type of house inhabited by the Chinese farmer is made of mud. It has a tamped mud wall, varying in width from 6 to 12 inches, and may or may not have a stone or brick foundation. Poor people in central and North China have houses constructed of kaoliang stalks, used like lath, with mud plastered on each side for the walls. In some sections sun-dried mud bricks are used for walls, and some of the more prosperous farmers have houses of kiln-dried bricks.

For roofs of the houses, the rafters are of wood covered with tile in many sections and straw in others. The timber used for the rafters comes usually from trees grown on uncultivated land. Rural houses constructed of wood or stone are practically nonexistent in China.

FUEL SUPPLIED PRIMARILY FROM FARM BYPRODUCTS

The most common fuel used by Chinese farmers is straw and stalks. Even most of these farm byproducts are in demand for other uses - principally for feeding livestock during winter months. In South China, where fuel is needed only for cooking, rice straw is the main product used. In this region wild grass and wood secured from uncultivated areas supplement the fuel supply. Those who live in the mountainous districts secure a large part of their fuel from such sources and usually sell straw in the cities.

In North China the fuel supply is a problem of serious concern to all farm people, since fuel is needed for heating the houses from 3 to 5 months of the year. Wheat and millet straw and kaoliang and corn stalks, the main products used, are also in considerable demand for feeding farm animals during the long winter months. In most sections of North China very little wild grass or wood is available to supplement the fuel supply.

Coal has been used for fuel in China for several centuries, as Marco Polo mentioned the use of "black stones" in China about 1290 A. D. While China is reputed to have one of the world's largest supplies of coal, the amount being consumed by farmers is insignificant. Farmers living within a radius of a few miles of mines commonly use coal. The high cost of transportation makes it too expensive for most farmers to use except for special purposes.

CLOTHING AND OTHER REQUIREMENTS SMALL

Cotton is the principal commodity used for clothing. In addition to being used for weaving cloth, it is also required for padding winter clothing and blankets. It is estimated that the per-capita consumption is approximately 4 pounds per year, compared with 25 pounds in the United States. In the latter country a large amount is consumed industrially, whereas in China very little is so used. To clothe the 425 million Chinese people requires 3,580,000 bales of raw cotton per year; and to produce this quantity approximately 8½ million acres of land are necessary.

Silk, wool, and grass linen are other fabrics worn by the Chinese. The total consumption of these fabrics, however, represents only a small percentage as compared with that of cotton. Statistics are not available to indicate the extent of production, but it is known that the acreage devoted to the production of these fibers is relatively small. Mulberry trees, used for producing leaves to feed silk worms, occupy cultivated land in areas where productive crops such as rice are raised. Rough estimates of the mulberry acreage in China range from 100,000 to 200,000 acres. The production of wool occupies very little cultivable land in the 18 Provinces, for sheep are generally pastured on uncultivated land and in winter consume straw and stalks. Grass linen is made from ramie fiber, and it is estimated that only about 50,000 acres of ramie are produced. Rayon is not considered important in China at the present time. There is only a small quantity produced, and imports are relatively small. If rayon production in China increases, it will probably be largely from imported raw material.

It is apparent that China requires approximately 9 million acres of cultivated land to produce sufficient fibers to satisfy present clothing requirements. In other words, 1 cultivated acre produces sufficient fiber for about 50 people in China. This compares with 1 acre for 5 people in the United States. In addition to food and clothing requirements, tobacco is an agricultural item which the Chinese use in a considerable quantity. It is roughly estimated that at the present time 1,300,000 acres are devoted to tobacco annually. With more than 10 million acres of cultivated land used for producing clothing and tobacco, China has from 150 to 215 million acres on which to produce food for 425 million people. This compares with 300 million acres in the United States used for producing food for 130 million people.

STATUS OF CROP AND LIVESTOCK PRODUCTION

Statistics on Chinese crop production have been vague and inadequate, and estimates at the present time are subject to considerable qualification for there has never been an agricultural census or a land survey taken for the whole country. In 1931, the Chinese Government began preliminary work in crop estimating. The National Agricultural Research Bureau took up this work in 1932, making favorable progress each year until 1937 in estimating the size of the crops.

Table 9. Production of principal crops in China and the United States, 1936 and 1937

CROP	UNIT	CHINA[a]		UNITED STATES[b]	
		1936	1937	1936	1937
Rice[c]	Million bushels	2,492	2,723	49	53
Wheat	do.	849	636	623	874
Barley	do.	374	d	147	220
Soybeans	do.	226	d	30	45
Millet	do.	382	d	e	e
Kaoliang (grain sorghum)	do.	305	d	55	9
Corn	do.	192	d	1,507	2,651
Sweet potatoes	do.	758	d	64	75
Tobacco	Million pounds	1,389	d	1,154	1,553
Peanuts	do.	5,958	d	1,337	1,321
Cotton	Thousand bales (478 pounds)	f 3,870	f 3,560	12,375	18,946

[a] National Agricultural Research Bureau except as indicated; Kwangsi Province omitted.
[b] Crop Estimates, Bureau of Agricultural Economics.
[c] About 6 percent should be added for Kwangsi Province.
[d] Not available.
[e] Not given, as it is relatively unimportant.
[f] Estimates by Owen L. Dawson, American agricultural commissioner, Shanghai.

The Agricultural Research Bureau made estimates of the principal crops for China Proper, excluding Kwangsi Province, which is fairly significant as a rice producer but in the production of other major crops is relatively unimportant. The data given in table 9 are presented to furnish some idea of the extent of agricultural production in China. Though these estimates do not include Kwangsi Province, they are considered the best figures available at the present time.

RICE - THE LEADING CROP

As indicated in table 9, rice is the outstanding crop of China. It is believed that rice has been cultivated in China since the dawn of civilization, for "rice" and "food" are synonymous in the Chinese language as well as in some of the other Asiatic tongues.

There are two principal types of rice grown, glutinous and nonglutinous. The bulk is nonglutinous and is used for daily consumption. Glutinous rice is more starchy, requires a longer growing period, and is used for special dishes at feasts and in cakes and wine. There are a great many varieties of rice raised in China, most of which are known only by the name of the locality in which they are grown.

The quality of Chinese rice is considered poor according to western standards, but Chinese prefer their rice to that imported from foreign countries. One of the principal reasons Chinese rice is considered low in quality is that it is not cleaned and polished to the extent required by Americans. From each 100 pounds of rough rice the Chinese consume as food from 70 to 80 pounds, while in the United States only from 61 to 63 pounds are used for food.

The methods of transplanting, cultivating, and harvesting the rice crop are practically the same throughout China. In South China the first crop is broadcast in seedbeds usually in March, transplanted in April, and harvested in July. The second crop is then immediately transplanted from the seedbed and is harvested in October or November. In the central part of China rice is sown in seedbeds generally during April, transplanted in May or June, and harvested from August to October.

The most common method of crop rotation in rice farming is to use the same fields for rice each summer but to vary the winter crop. In South China, where two rice crops are produced, the most common practice is to fallow during the winter - although some farmers grow vegetables, wheat, barley, or beans in the rice fields. In central China the same fields are generally used for rice each summer, and during the winter such crops as wheat, barley, broadbeans, and red clover are grown. In some sections of central China rice is rotated to some extent with soybeans and cotton, but in general, farmers are loath to shift their rice fields to other crops because the fields have been constructed for convenient irrigation and the subsoil has developed an impervious condition suitable for holding water.

Rice yields in China are approximately the same as those in the United States. In 1936, the average Chinese yield was 52 bushels per crop-acre, which compared with

50.6 for the same year in this country. The intensive culture, which results in a good stand and clean cultivation, is offset by insect damages, lack of sufficient fertilizer, and, in some cases, low-yielding varieties.

Rice is considered the most profitable crop; yet it is also one of the most expensive to produce on account of the large amount of labor required and the quantity of fertilizer necessary. In several districts farmers do not put all of their fields into rice because of the lack of capital.

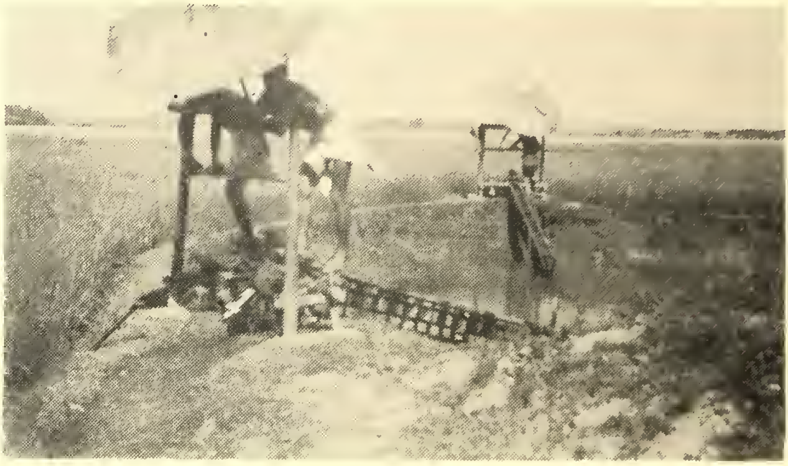

Fig. 17. Irrigating rice fields requires a large amount of labor.

Information is inadequate to determine whether there has been a trend during the past few decades in the size of the Chinese rice crop. There is some evidence that increased production has occurred in some localities whereas decreases have taken place in other parts of the country.

During years of normal production there are regular surplus and deficit rice areas in China. Under average weather conditions the central Yangtze Valley, consisting of the three Provinces of Hunan, Kiangsi, and Anhwei, produce a crop in excess of local requirements. The principal deficit area is Kwangtung Province, followed by the cities of Shanghai, Tientsin, and frequently some of the port cities of Chekiang and Fukien Provinces. The quantity of rice shipped from surplus to deficit areas is relatively small and the bulk of the rice produced in China is consumed where it is grown.

China has been a deficit rice country every year for the past 70 years, according to the *Foreign Trade of China*. Total imports are small in comparison with production, usually amounting to about 1 percent and never exceeding 4 percent. Imports were largest during the period from 1921 to 1935, when the country was the world's leading rice importer with annual imports averaging over 2 billion pounds.

Several factors have caused rice imports into China to fluctuate from a little over 100 million pounds in 1920 to a record high of 2,998 million pounds in 1932 and back to 762 million pounds in 1937. The variation in domestic production is undoubtedly the most important reason, and imports are reduced following good crops.

Prices of Chinese rice in comparison with world prices is an essential factor, as illustrated by the small imports when world prices were high in 1920 and the large imports in 1932 when world prices were low. In the latter year, however, low world prices were combined with a very short Chinese harvest the previous fall. Relative prices of foreign rice in China are affected by varying exchange rates and import duties. An important factor causing large imports from 1921 to 1930 was civil war in China, which disrupted transportation and occasioned numerous local taxes, thereby preventing the free movement of rice from surplus to deficit areas.

Table 10. Chinese imports and exports of rice, average 1921-1930, annual 1932-1937

YEAR	IMPORTS FROM						TOTAL EXPORTS
	HONG KONG[a]	FRENCH INDOCHINA	SIAM	BRITISH INDIA AND BURMA	OTHERS	TOTAL	
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average							
1921-1930	1,270,635	347,725	144,663	302,126	84,665	2,149,814	5,616
1932	153,063	1,010,241	858,245	955,843	20,799	2,998,191	4,808
1933	25,333	1,248,502	1,007,041	559,719	15,200	2,855,795	13,821
1934	29,066	754,514	761,181	141,330	13,733	1,699,824	15,055
1935	2,533	1,661,958	756,248	426,256	11,066	2,858,061	14,482
1936	800	249,327	388,124	43,199	2,667	684,117	59,240
1937	933	404,923	242,794	110,531	3,066	762,247	47,251

[a] **Hong Kong is only a port of transshipment.**

Foreign Trade of China.

There is no definite trend in rice consumption apparent from the data available. With a few years of rural prosperity, it is possible that rice consumption would increase; but for the past 20 years the standard of living has remained low as the result of warfare, floods, and droughts.

The majority of the people living in the rice belt eat rice three times a day. In many sections it is eaten in the form of a gruel in the morning and for the other two meals is boiled dry and eaten with vegetables and sometimes meat or soybean products. A rough calculation indicates that the per-capita consumption is as high as 300 pounds. In this same region, however, there are many poor people who cannot afford a regular rice diet.

WHEAT PRODUCTION LARGE

Many who think of China only as a large rice producer do not realize that this country is one of the largest wheat-growing nations. China, being approximately self-sufficient in wheat, is generally not important in the world wheat situation, although from time to time it has been a factor in international trade. During the World War, net exports averaged about 13 million bushels, and during the post-war period China has been a significant importer. At the time of the world depression, 1929-1934, Chinese wheat (including wheat flour) imports were at a record high, averaging over 44 million bushels; and China was the world's third largest wheat-importing nation, being exceeded only by the United Kingdom and Belgium.

Wheat is primarily a winter crop in China. Only about 2 percent is spring wheat, produced in the northwest Provinces where the altitude is higher and the climate colder than in other parts of the country. It is grown in every Province in China, but it is an important crop only from the Yangtze Valley north. In North China it is the outstanding crop, occupying on an average about 50 percent of the cultivated land. In the Yangtze Valley from 20 to 40 percent of the crop-land is in winter wheat, and in the farm organization it is second only to the summer crop of rice. In South China less than 10 percent of the cultivated land is used for winter-wheat production.

The wheat acreage in China was estimated by the National Agricultural Research Bureau at approximately 50 million acres in 1936 and 42.6 million in 1937. This compares with the average for 1933-1937 of 51 million acres harvested in the United States. The yield for Chinese wheat was estimated by the Agricultural Research Bureau for 1936 at 16.8 bushels per acre and in 1937 at 14.9 bushels. Although this yield is higher than the average for the United States, it is much lower than for most European countries.

Statistical data are not available to show whether China's wheat production has been increasing during the past few decades, but general information indicates that there has been little, if any, trend. Wheat production, however, varies considerably from year to year because of climatic conditions, which affect both acreage and yield. The most important factor causing fluctuations in production is undoubtedly the irregular rainfall. In many districts of North China there is frequently insufficient moisture for seeding, and the planted acreage is thus reduced. During the spring months rainfall is often very short, and low yields result. In the Yangtze Valley excessive rainfall during the spring occasionally damages the wheat crop. Additional factors, such as the farm price of wheat in relation to that of other crops, also affect the acreage sown.

Wheat in all parts of the country has competition from other crops for the use of the land. In the Yangtze Valley the chief competitors are barley, broadbeans, and rapeseed, although the wheat acreage in most areas exceeds that of any one of these crops. In North China the only crop that directly competes with winter wheat is barley, and the acreage sown to that crop is equal to less than 15 percent of the wheat acreage.

The factors that limit the winter-wheat acreage to about 50 percent of the cultivated land in North China are the summer crops. Some of these are not off the land in the autumn in time for wheat sowing, and others must be planted in the spring before the wheat is harvested. As an example of the competition for land, in some districts of North China peanuts are planted between the wheat rows some weeks before the grain is harvested, and in some parts of the Yangtze Valley cottonseed is broadcast in the wheat fields about a month before harvest so that after the grain has been cut the cotton plants are already from 1 to 3 inches high. In some districts of the Yangtze Valley, and to a considerable extent in South China, the land is left fallow in winter because the farmer wishes to conserve his fertilizer resources for use on more profitable summer crops.

Wheat production in China under intensive farming with hand labor is in vivid contrast to mechanized farming in the wheat areas of the United States. Winter wheat is generally planted during September and October and is harvested between May 20 and June 10. In South China, however, the crop is planted later in the fall and harvested earlier in the spring.

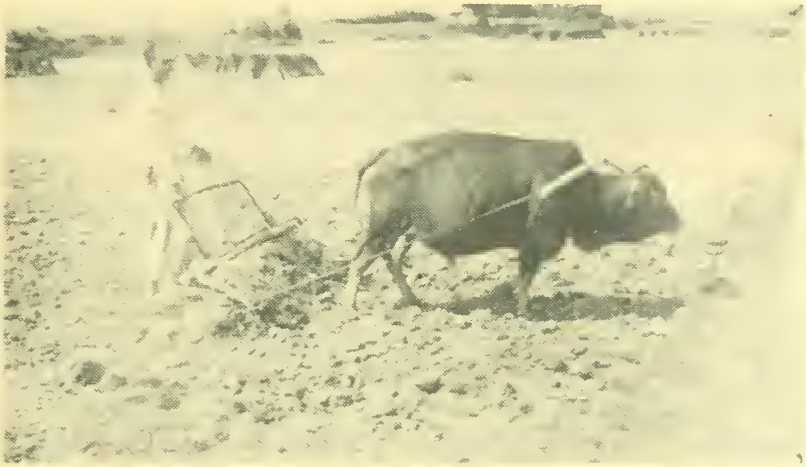

Fig. 18. Harrowing the land in preparation for winter wheat sowing.

Fig. 19. An excellent wheat field near a city in Shantung. Fields in the country are not so heavily fertilized.

According to a study made in Shantung Province[16] in a typical wheat-growing section, it was found that 238 man-hours were required to produce an acre of wheat, whereas in the United States it has been estimated[17] that 8 man-hours are now required. In preparing the land for wheat in China, the farmer uses a donkey, cow, or horse for plowing and harrowing. In North China, where most of the wheat is planted in rows, farmers usually have a small drill pulled by the work animal. In the Yangtze Valley most of the wheat is broadcast by hand.

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[16] Swen, W. Y., *A Study of Types of Farming, Costs of Production, and Annual Labor Distribution in Weihsien County, Shantung, China*, University of Nanking, 1928.

Most farmers apply fertilizer in the form of manure or vegetable-oil cakes to the wheat fields, especially in the north where wheat is usually the most profitable crop. Man labor is often required for irrigation in North China, wherever irrigation facilities are available. In both the Yangtze Valley and North China the harvesting of wheat is done either by a hand sickle or by pulling the plants up by the roots and is threshed by a flail or by beating small bunches over slats, letting the grain fall on the ground. The farmer generally makes use of the wind to separate the grain from the chaff and dirt, although in some districts fanning mills are used for this purpose.

The quality of Chinese wheat depends upon the area in which it is produced and the weather conditions. Yangtze Valley wheat is generally considered poor because of small kernels, low gluten content, and high percentage of moisture. Weather conditions at ripening time are usually rainy, making harvest difficult. Wheat produced in this region, according to United States standards, is graded No. 3 and No. 4, Soft Red Winter.[18] The quality of North China wheat depends considerably on the weather. In years of sufficient rainfall, the grain compares favorably with wheat produced in western countries. The grains are small, but the strength is near that of Canadian wheat. The grade, according to United States standards, varies from a No. 2 to a No. 4 mixed (containing Soft Red Winter and White).

Wheat prices in China fluctuate seasonally as in other countries. Prices are usually lowest at the time of heavy marketings from June to August, advance and remain at a higher level during the winter months, and then decline in the spring, provided the new-crop prospects are favorable. Foreign wheat prices, however, occasionally affect prices in China, especially during the winter months when Southern Hemisphere wheat enters the world market. Wheat prices in China, however, are primarily set by the domestic supply and demand. Many other factors also have an influence upon the price, such as exchange rates, import duties, demand for wheat byproducts, and prices of competing foodstuffs.

During the past three decades, China has been now a net importer and again a net exporter of wheat. Prior to 1922, the country was a net exporter of wheat, and shipments abroad from 1918 to 1921 were of a significant volume as a result of high war prices. China's wheat supply, however, has been deficient for domestic requirements during the past 15 years, frequently on account of droughts or floods and in some years as the result of military conflicts or short wheat harvests.

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[17] Unpublished records of the Bureau of Agricultural Economics, United States Department of Agriculture.

[18] Unpublished report of milling and baking qualities of Chinese wheats analyzed by the Bureau of Agricultural Economics.

Table 11. Chinese production, imports and exports of wheat averages 1911-1915 to 1931-1935, annual 1936 and 1937

YEAR	PRODUCTION[a]	IMPORTS		EXPORTS		NET IMPORTS OF WHEAT AND WHEAT FLOUR IN TERMS OF WHEAT
		WHEAT	FLOUR	WHEAT	FLOUR	
	1,000 bushels	*1,000 bushels*	*1,000 bags*	*1,000 bushels*	*1,000 bags*	*1,000 bushels*
Average-						
1911-1915	b	5	5,619	3,837	899	1,715
1916-1920	b	45	925	7,738	5,309	-12,844
1921-1925	b	4,175	10,649	3,259	1,751	11,366
1926-1930	b	6,744	16,989	1,388	192	25,093
1931-1935	780,000	31,941	9,029	373	727	41,324
1936	790,000	4,292	1,395	1,164	415	4,279
1937	640,000	1,582	1,367	263	70	2,843

[a] Estimates made by the American agricultural commissioner at Shanghai.

[b] Not available.

Foreign Trade of China.

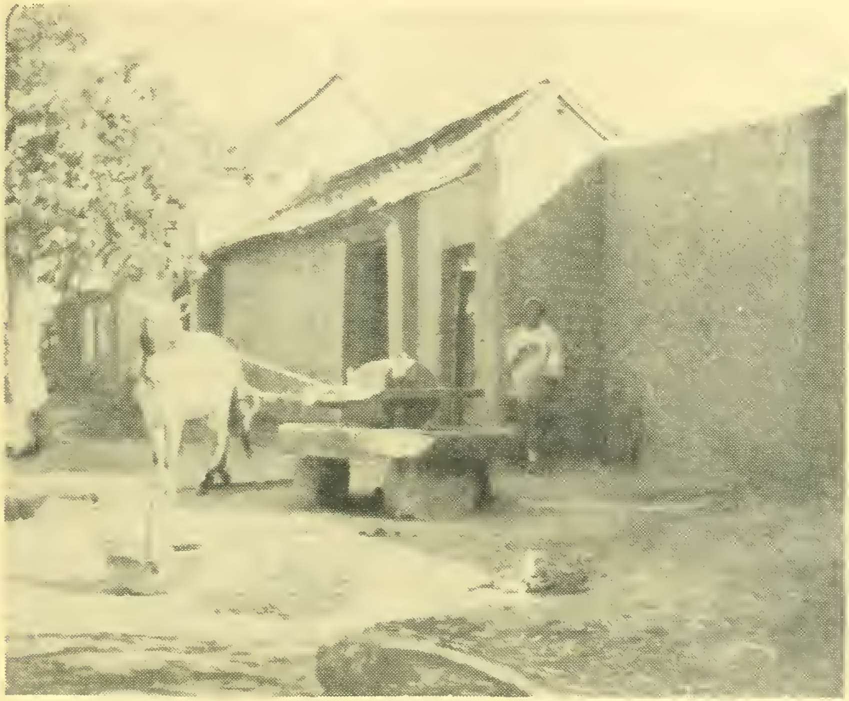

Fig. 20. A country flour mill. Most rural families have some sort of mill to grind their grain.

Wheat in China is consumed largely as flour, ground in the country by native mills. These mills are small and usually of home construction, some having a small engine for power but most of them operated by animal power. Modern mechanized flour mills are, for the most part, a recent development. Only two modern mills were in existence prior to 1900. A rapid expansion of large mechanized mills took place from 1915 to 1924, when mills were constructed in every large city from the Yangtze Valley to North China. At the beginning of 1937, there were 70 modern commercial flour mills with a total capacity of approximately 300,000 bags of 49 pounds per day. The principal flour-milling centers, in the order of their importance, were Shanghai, Tsinan, Hankow, Tientsin, Wusih, and Nanking. Even with the development of the modern milling industry, more than 85 percent of the wheat flour consumed in China was produced by native mills.

Table 12. Wheat imports into China, averages 1925-1929 and 1930-1934, annual 1935-1937

YEAR	UNITED STATES	CANADA	AUSTRALIA	ARGENTINA	OTHERS	TOTAL
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Average--						
1925-1929	732	4,472	640	0	19	5,863
1930-1934	5,747	3,866	17,695	1,757	287	29,352
1935	177	38	14,947	3,873	105	19,140
1936	b	116	3,550	–	626	4,292
1937	b	–	1,582	–	b	1,582

[a] After July 1, 1932, Manchuria is not included.

[b] Less than 500 bushels.

Foreign Trade of China.

Despite the increased number of modern mechanized flour mills, during the past three decades China has intermittently been a large market for imported flour. Because of very low food reserves, especially in North China, whenever such a disaster as famine or war occurs it is necessary to import food supplies, and flour is usually the most desirable and convenient product. From 1923 to 1932, flour imports averaged approximately 16 million bags per year, of which the United States usually furnished about 35 percent. The Chinese market was an important outlet for United States Pacific Coast wheat.

Table 13. Wheat-flour imports into China, averages 1925-1929 and 1930-1934, annual 1935-1937

YEAR	UNITED STATES	CANADA	AUSTRALIA	JAPAN	HONG KONG[a]	OTHERS	TOTAL
	1,000 barrels	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*
Average							
1925-1929 ..	1,259	838	3	1,215	598	13	3,926
1930-1934[b] ..	1,214	131	340	874	304	15	2,878
1935	194	147	206	25	1	1	574
1936	39	124	126	58	c	2	349
1937	80	88	164	6	1	3	342

[a] Flour from the United States, Canada, Australia, and Japan; in the last few years flour from Hong Kong has been recorded as from original sources.

[b] After July 1, 1932, Manchuria was not included.

[c] Less than 500 barrels.

Foreign Trade of China.

The consumption of wheat flour is important in the diet of about 150 million Chinese people, principally those living in North China. In the Yangtze Valley and in the south, wheat flour is a minor food. In China only a small part of the wheat flour is used for bread making; the bulk is consumed as noodles and batter cakes. A high-quality flour according to United States standards is therefore not required, and "country" milled flour is able to compete extensively with modern machine-made flour. In the large cities consumption of bread and cakes of the western style has developed. A few modern bakeries and the larger hotels demand high-quality flour, which has been supplied principally by imports.

COTTON, A MINOR CROP

Cotton, although a relatively minor crop compared with the major food crops raised in China, is important enough to rate the country as the world's third largest producer. It is grown over a wide area with some production in every Province. In South China it is cultivated in only a few districts not generally suitable for rice production. In the Yangtze Valley and North China some cotton is probably grown in every county, and in a few districts is among the major commodities raised.

Major producing regions - The principal cotton-growing areas may be roughly divided into two regions; namely the Yangtze Valley and North China. The Yangtze Valley is in the same latitude as southern Georgia, and North China about the same as North Carolina and southern Virginia. In these two cotton regions of China, the basic factors affecting production - climate, soil, and cropping systems - are materially different. Weather conditions that are favorable in one region are often unfavorable in another. In the Yangtze Valley cotton and a second crop are regularly produced on the same land each year, whereas in North China only one crop is raised.

The large cotton-producing areas in these two regions are located where transportation facilities are available and make it possible to market raw cotton at the milling centers at costs that are not prohibitive. In the sparsely cultivated areas, very little raw cotton reaches a modern spinning mill, most of it being used for home consumption.

Cultural practices - Cotton planting and harvesting in the two major producing regions occur at approximately the same time. Planting is usually begun about the first of May, although wet weather in some localities in the Yangtze Valley and the lack of moisture in North China may make later planting necessary. It is possible to plant cotton up to the end of May; if moisture conditions are not suitable by that time, some other crop is planted.

In many sections of the Yangtze Valley cottonseed is commonly broadcast in the wheat or barley fields. When the grain crop is harvested the last of May, the young cotton plants are from 1 to 3 inches high. In North China the cotton fields are spring-plowed, harrowed, and seeded by hand in rows. The principal method of cultivation in both regions is hoeing by hand. Irrigation, common in some districts, requires a considerable amount of work. Water, usually obtained in the Yangtze Valley from canals and in the north from wells, is pumped onto the fields, either by a power wheel pulled by a farm animal or by human labor using buckets or operating an endless chain.

Various kinds of fertilizers are used for the cotton crop. The Chinese have a saying, "If seeds are planted, feed must be provided for the young plants." Barnyard manure, canal and pond mud, ashes, and, to a limited extent, vegetable-oilseed cakes are some of the common fertilizers used.

Picking the cotton crop in China is work at which all members of the family lend a hand. The first picking begins about the middle of August, about 70 percent of the crop is harvested during September, and late picking in North China ends in early October. Several pickings are made during the season, with the result that very little cotton is lost in the field. This is one factor contributing to the high yields obtained in China.

Factors affecting production - China is fairly well suited for growing cotton insofar as temperature and soil are concerned, but irregular rainfall makes production somewhat uncertain. In the Yangtze Valley excessive rainfall often damages the crop, especially on the low-lying fields having poor drainage. In North China the lack of rainfall frequently reduces production. In the spring there is occasionally insufficient moisture for planting, and in some years the summer rains do not come until it is too late to mature the crop. Only a few districts have irrigation facilities, which normally insure a fairly good crop.

Economic factors are more significant than physical factors in determining the quantity of cotton produced. The density of population and the small percentage of cultivable land limit cotton acreage. The Chinese farmer's first great concern is to produce sufficient food. No matter how attractive cotton prices may be in relation to other commodities, he never grows cotton to the complete exclusion of food crops. Nevertheless, the relative price of cotton is a factor that undoubtedly causes the Chinese farmer to increase or decrease his acreage.

Trends in production - Chinese cotton production during the past 15 years has increased approximately 50 percent. According to statistics compiled by the American agricultural commissioner at Shanghai, production during 1920-1924 averaged about 2,400,000 bales of 478 pounds and the harvests in 1936 and 1937, two record crops, averaged over 3,700,000 bales. This expansion has been almost entirely the result of increased acreage, for the yield per acre has not changed appreciably. The larger acreage in recent years was brought about by improved transportation, political stability, and Government aid in the distribution of improved seed and the provision of better credit facilities.

Quality of cotton - Chinese cotton has long been known for its short staple and poor spinning qualities. There are, however, many degrees of quality and lengths of staple grown in China, although there is no reliable information as to the quantities of the various grades produced. The staple length of most native cotton is from one-half to three-fourths of an inch. Chinese agricultural experiment stations for a number of years have been growing American and improved Chinese varieties and supplying farmers with increasing quantities of improved cottonseed. As a result, in both cotton-producing regions there has been a marked increase in production of staple three-fourths to an inch in length.

A type known as rough cotton is produced in a number of sections in North China and in a few districts in the Yangtze Valley. This type, about one-half inch in length, is wiry and has not been used by modern power spinning mills, except possibly for 10- to 12-count yarn. It has, however, been in demand in foreign countries for padding and for mixing with wool. At times it has commanded higher prices than improved American cotton in some of the world markets.

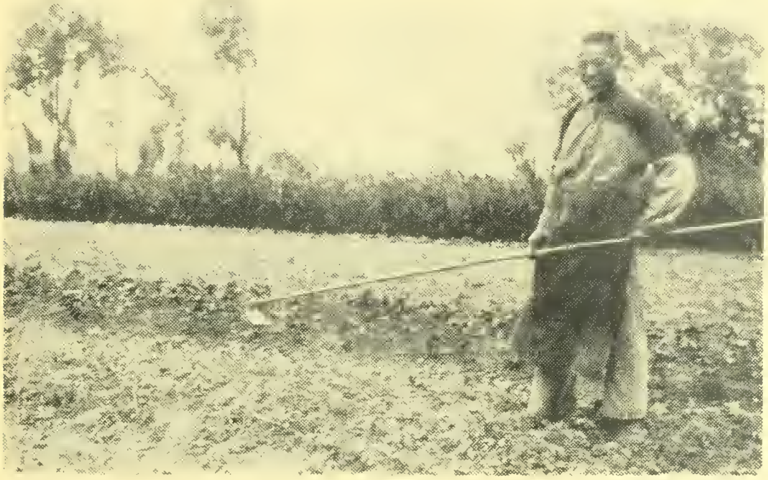

Fig. 21. Hoeing small cotton plants just after wheat harvest near Shanghai. Cottonseed was broadcast in the wheat field about a month before harvest.

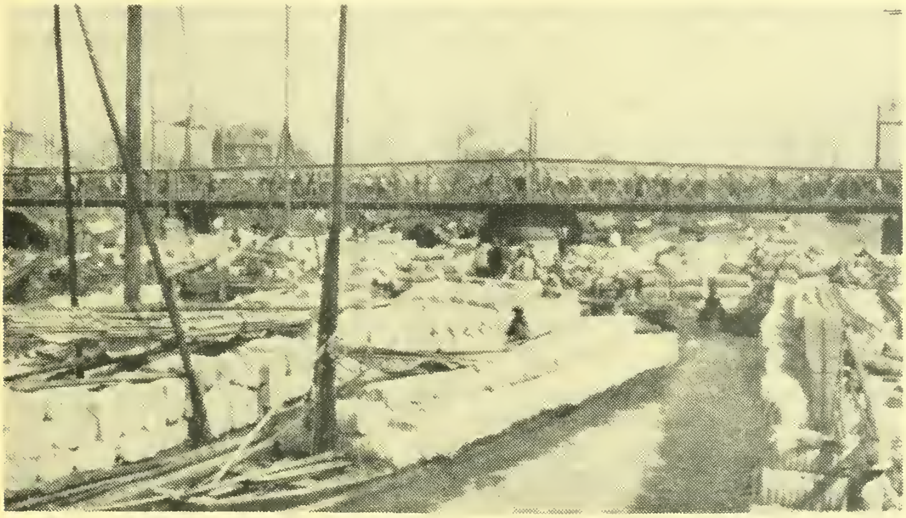

Fig. 22. Cotton arriving at Tientsin, an important cotton-marketing center.

Consumption - The need for cotton clothing is greater in China than it is in the United States, since other fibers, such as rayon, wool, and silk, are not worn to any great extent. There is little heat in Chinese houses, and body heat is conserved by wearing several garments. The temperature is vividly described in the Chinese language as "one coat," "two coat," or "three coat" weather. In winter padded cotton garments are almost universally used in central and northern China.

Total consumption of raw cotton in China has been calculated at approximately 3½ million bales annually. Fully two-thirds of this is spun in modern mills, and the remainder is spun, woven, and made into padded garments and blankets at home.

Table 14. Chinese cotton production, imports, and exports,[a] 1910-1937

YEAR	ESTIMATED PRODUCTION	IMPORTS IN TERMS OF RAW COTTON			EXPORTS OF RAW COTTON	APPARENT CONSUMPTION
		COTTON	TEXTILES	YARN		
	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales
1910	–	57	502	750	348	–
1915	–	102	681	882	202	–
1920	2,406	189	752	435	105	3,677
1925	2,458	504	727	212	223	3,678
1930	2,615	964	605	54	230	4,008
1931	2,092	1,298	395	16	220	3,581
1932	2,720	1,036	380	31	185	3,982
1933	2,981	556	234	9	202	3,578
1934	3,243	536	92	6	97	3,780
1935	2,667	253	94	5	145	2,874
1936	3,870	188	40	3	170	3,931
1937	3,560	71	–	–	176	3,455

[a] In bales of 478 pounds.

Import and export statistics compiled from *Foreign Trade of China*; production estimates made by the American agricultural commissioner at Shanghai.

Import and export trade - Chinese cotton production until about 1937 was insufficient for domestic requirements, and cotton textiles and raw cotton were among the major imports. From 1920 to 1933, China consumed, on an average, 700,000 bales of American cotton annually in the form of raw cotton, piece goods, and yarn, in addition to a considerable quantity of Indian staple. If production were maintained near the 1937 level, China would be self-sufficient in raw cotton. Imports of a small quantity of long-staple cotton would be necessary for spinning fine-count yarn, and some types of Chinese cotton would be exported. The principal type exported is the rough cotton, largely to Japan, with small quantities to the United States and other countries.

TOBACCO PRODUCTION LOCALIZED

Tobacco in China is a less important crop even than cotton; but, like cotton, it is grown over a wide area with important commercial production concentrated in a relatively few districts. Production is sufficiently large, however, to rate China, along with the United States and India, as one of the world's largest tobacco producers. Tobacco production in China is of particular interest to the United States, because China has for many years been an important market for American flue-cured tobacco. In recent years a large Chinese crop of this type has been grown and is now being substituted for American leaf.

Total tobacco production in China is not definitely known, but conservative estimates place the annual crop between 1 and 1.4 billion pounds.[19] Practically all the tobacco is produced by farmers who grow only small patches; the average acreage per farm in the most important producing districts is only about seven-tenths of an acre. Hand methods are used in cultivating, irrigation is general, and other high-yield practices are followed. The average yield for all China is probably about 1,030 pounds per acre, compared with 800 pounds in the United States.

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[19] *Crop Reporting in China*, National Agricultural Research Bureau, Nanking, Special Publication No. 13, August 1936, p. 22.

Table 15. Chinese tobacco imports, exports, and flue-cured production, average 1923-1927, annual 1928-1937

YEAR	IMPORTS		EXPORTS	FLUE-CURED PRODUCTION
	UNITED STATES	TOTAL		
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average 1923-1927	66,281	78,043	28,818	41,060
1928	133,954	142,647	19,615	33,000
1929	117,159	121,459	17,014	38,200
1930	120,607	123,458	15,529	83,500
1931	160,886	165,609	18,330	111,000
1932	78,715	78,359	13,243	104,000
1933	53,308	53,760	20,907	149,000
1934	63,293	65,052	32,768	140,000
1935	14,725	17,766	29,934	163,000
1936	22,371	25,091	37,921	180,000
1937	33,508	37,218	33,729	210,000

Import and export statistics from *Foreign Trade of China*. Flue-cured production estimates made by the American agricultural commissioner at Shanghai.

There are several types of Chinese tobacco, but it cannot be classified in accordance with the rules followed in classifying United States leaf. In general there is but limited similarity between the two, and some Chinese types cannot be compared with any of the standard American types. Moreover, the different Chinese types are not associated with specific products to the same extent as in the United States.

The three main groups of Chinese tobacco, classified according to curing methods and use, are sun-cured, cigar, and flue-cured. Of the total production, it is roughly estimated that 47 percent is sun-cured, 40 percent cigar, and 13 percent flue-cured.[20]

It is believed that tobacco is not indigenous to China but was introduced about 1600, possibly from the Philippines, where it had been brought a few years earlier by Spanish missionaries and traders. It was also probably introduced from other sources as well. Sun-cured and cigar types have been grown in China for a long time with no attention given to developing specific types. Flue-cured leaf was introduced into China from American seed only about 25 years ago. As a result of increased consumption in China, encouragement by a foreign tobacco company, and increased Chinese duties on imported leaf, the production of flue-cured leaf has increased rapidly, from less than 3 million pounds in 1916 to a record crop of 210 million pounds in 1937.

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[20] Gibbs, J. Barnard, *Tobacco Production and Consumption in China*, FS-77, U.S. Department of Agriculture, September 1938, p. 9.

The principal way of consuming tobacco in China for many centuries has been pipe smoking, for which sun-cured and cigar types are still primarily used. The use of cigarettes made largely of flue-cured leaf has grown very rapidly during the past 30 years. Cigarette consumption to a great extent is confined to cities, whereas pipe smoking is general in the interior. Cigarettes at first were imported from the United States and England. A few years later cigarette factories were established in China, using principally American flue-cured leaf. With the increase in Chinese production of this type of tobacco and the higher cost of American leaf as a result of higher import duty, the proportion of Chinese leaf used in making cigarettes rapidly increased. Total tobacco consumption is estimated to be about 2.8 pounds per capita compared with 6.6 pounds in the United States.

VEGETABLE-OILSEED PRODUCTION LARGE

The combined farm value of vegetable-oilseed crops in China is undoubtedly much greater than that of cotton and tobacco. With the possible exception of India, China is the largest vegetable-oilseed-producing country. Such crops as soybeans and peanuts, the two most extensively grown oilseeds in China, are raised in every Province, with Shantung, Honan, and Hopei in North China the heaviest producers.

Soybean production, estimated at 226 million bushels, is nearly 50 percent larger than that of Manchuria, which furnishes approximately 90 percent of the soybeans that enter international trade. The large Chinese crop is practically all consumed within the country. Though some of the beans are used for extracting oil, a larger proportion is ground and the milk coagulated into a curd. The soybean curd, consumed either raw or cooked in deep fat, is a common food throughout the country.

Chinese *peanut* production is four times as large as that of the United States and is exceeded only by the Indian production. China usually has an export surplus of peanuts, shipping from 2 to 12 percent of the crop to foreign countries. North China generally furnishes a substantial quantity to Kwangtung Province in South China. Peanut oil is extensively used in all parts of the country.

Rapeseed Production is important in many sections of the Yangtze Valley and to some extent in South China. It is a winter crop usually grown on rice land and harvested in the spring before rice is transplanted. A considerable quantity is generally exported from the Yangtze Valley. *Flaxseed* and *mustard seed* are grown in the northwestern part of China in the Provinces of Chahar and Suiyuan. When transport facilities are available, surplus production of these seeds is usually exported from Tientsin. *Sesame seed*, another important oilseed crop grown principally in North China and the Yangtze Valley, is consumed extensively in China. Substantial quantities are also shipped to foreign countries.

Tung oil, extensively produced in Kweichow, Szechwan, Kwangsi, Hunan, and Chekiang Provinces, is not a field crop. The tung tree is generally grown on waste land, hillsides, and areas where crops are not cultivated. No estimates are available to indicate the extent of Chinese production. It is known, however, that average exports from China during 1933-1937 totaled 177 million pounds; and, since domestic consumption is large, it is possible that exports may not represent more than 50 percent of the total production.

Teaseed oil, widely used in China and commonly exported, is not obtained from the ordinary tea plant *(Thea sinensis)* but from a shrub *(Thea sasanqua)*, which grows wild or semicultivated on hillsides and attains a height of 6 or 8 feet. The oil is used locally for cooking, as hair oil, as an illuminant, and in making soap and medicine.

In spite of the heavy consumption of vegetable oils, China usually has a surplus available for export, especially when prices are favorable. The United States obtains large quantities of tung oil from China, some flaxseed, and in years of short supplies substantial quantities of other oils and oilseeds. Japan is an important market for Chinese rapeseed, peanuts, and some of the other vegetable oilseeds.

POSITION OF LIVESTOCK

Chinese agriculture is adapted primarily to the production of food for direct human consumption and not of grain to feed livestock. Meat in the diet may be characteristic of a higher standard of living, but cereal and vegetable foods are more economical to produce; therefore, in China livestock production is not stressed but is merely a byproduct of the farm enterprise.

The number of livestock in China is not known, but the National Agricultural Research Bureau of the Chinese Government made a sample survey in several districts in 1934 and prepared an estimate for the country, excluding Kwangsi Province (see table 16).

Table 16. Livestock numbers in China and the United States

KIND	CHINA[a]	UNITED STATES[b]	KIND	CHINA[a]	UNITED STATES[b]
	1,000 head	*1,000 head*		*1,000 head*	*1,000 head*
Cattle	21,638	74,262	Goats	22,677	4,093
Water buffaloes ..	12,172	0	Sheep	14,926	53,713
Horses	3,874	12,052	Hogs	69,038	58,621
Mules	3,865	4,945	Chickens ...	278,449	455,182
Donkeys	10,132	d	Ducks	69,337	c
			Geese	13,232	c

[a] For 1934; incomplete since Kwangsi Province estimates were not available.

[b] For 1935.

[c] Not available.

[d] Not given separately.

Official data of the National Agricultural Research Bureau, Nanking; *Agricultural Statistics* and *Agricultural Census of 1935*, U. S. Department of Agriculture.

The Chinese farmer, with an average-sized business or above, owns some sort of work animal. According to J. Lossing Buck's land-utilization study, nearly 80 percent of the farms have a work animal, which is used for plowing, harrowing, grinding, in many sections for pumping water for irrigation, and in some areas for transporting goods to market. In North China it is usually a horse, cow, or donkey, but in the Yangtze Valley and South China it is generally a cow or water buffalo, since these animals are better adapted for working in rice fields. In summer work animals live principally on grass obtained from the edge of fields and uncultivated areas and in winter on straw, stalks, and sometimes grain byproducts.

Although the total number of hogs in China is greater than in the United States, there are no hog farms like those of the American Middle West. Very few farmers in China ever raise as many as six hogs, from one to three head being common. American methods of pork production are more expensive, since in China hog rations have little commercial value. For the same reason, it takes a much longer period to produce a 150-pound hog in China. In spite of the larger number, therefore, it is doubtful whether the total annual pork production equals that of the United States.

Though hog production is widespread, with some probably in every district, hog numbers are highest in the Yangtze Valley and South China. There the favorable weather makes it possible for the animals to forage for much of their feed the entire year. Possibly half of the farm families feed one or more hogs. Many keep a brood sow, and others feed a few pigs. The family brood sow normally farrows two litters a year. The animal generally runs loose, has to hunt for part of its living, such as grass and waste products about the farm, and derives the rest from kitchen waste with the addition of some rice bran or other grain byproducts.

Pigs at the time of weaning are usually sold to other farmers who make a practice of raising them for market. Pigs are generally kept in a pen, although in North China they are frequently herded on waste land. They obtain scraps from the kitchen and grain byproducts and are commonly fed various kinds of oilseed cakes for fattening.

Several types of hogs are found in China, although very little effort is made to maintain distinct breeds. The black hog, somewhat similar to the Poland, is the most common. A black hog with heavy wrinkles in the face and large floppy ears is another type found in some areas. A similar type, but white in color, is raised in some sections. In some districts of the Yangtze Valley a spotted hog, similar to the Spotted Poland China of the United States, is also raised. It is believed that these various types have been raised in China for many centuries, for there is no information to indicate that they were introduced from foreign countries.

The total pork production in China is almost entirely consumed within the country. A small export trade exists, consisting principally of hams, which are shipped largely to the Philippine Islands; exports of such hog byproducts as bristles and casings, however, are of more importance in international trade. The United States is one of the leading markets for these products. Bristles from Chinese hogs are long and coarse, largely as a result of the hardships that the animals endure, especially in North China, where they have to forage for at least part of their food in the cold winter weather.

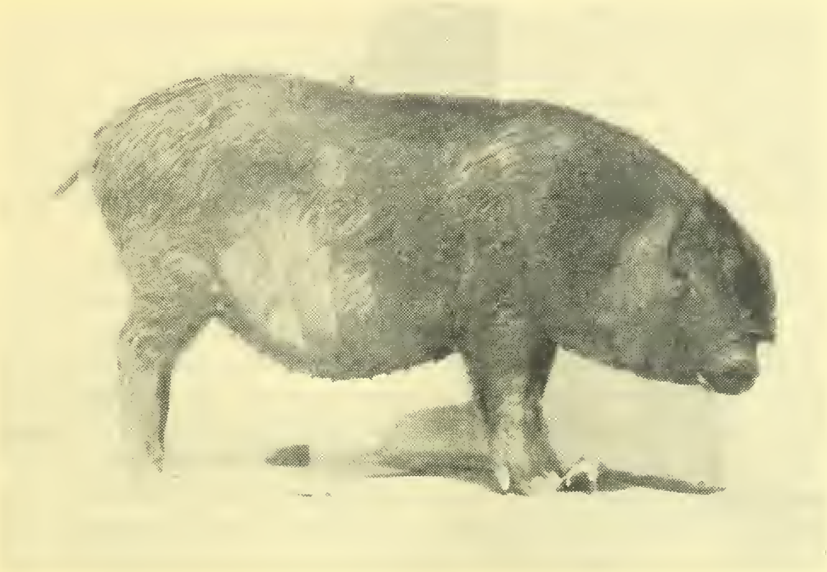

Fig. 23. A typical black Chinese hog at the market, Shanghai.

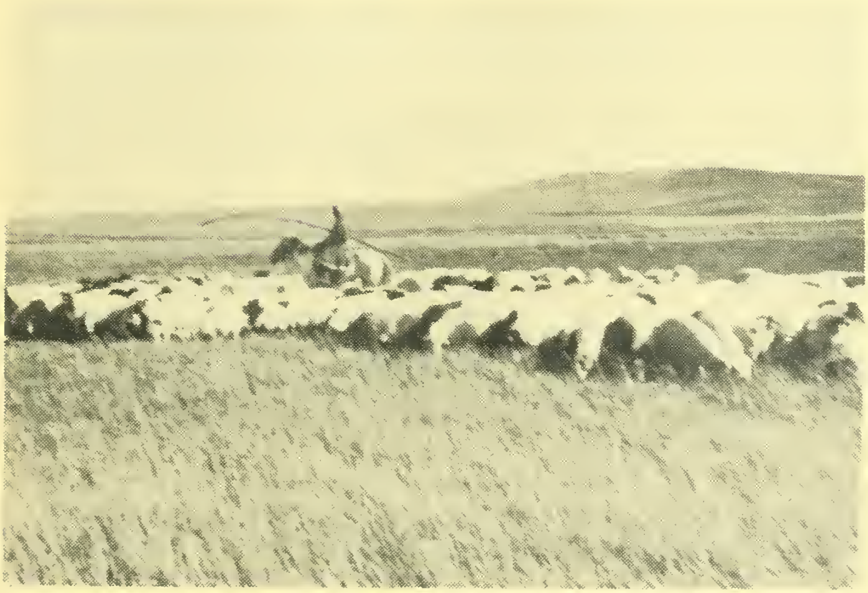

Fig. 24. Sheep on the Mongolian plain.

Goats and sheep, also livestock that are raised on feed of practically no commercial value, are common in many parts of the country. Goats are raised principally in northern, central, and western China and sheep largely in the north. In North China a farmer may own from 3 to 20 head, but in other parts of the country

1 or 2 animals per family is more common. Sheep raising in the northwest Provinces, Mongolia, and Tibet is not a side line but the chief occupation. In these regions grazing is the principal type of farming. Goat and sheep skins and carpet wool are among China's leading export products.

The raising of chickens is an important side line in Chinese farming, carried on by approximately 90 percent of the farmers. Many families keep only one or two hens, but the average-sized flock is somewhere between four and six. Chickens in China, even more than hogs, are scavengers. They compete with hogs for the farm waste and they pick up a considerable quantity that the hogs overlook.

Though there are fewer chickens and a much larger population in China than in the United States and China normally has a food shortage, the country exports eggs. In many rural sections where it is possible to market eggs - that is, where transportation costs do not exceed their value - the country people consume eggs mainly on special feast days and sell the rest. Chinese farmers generally continue to sell eggs no matter how much the price declines, since the cost of production does not represent an out-of-pocket expense. Cash received from the sale of eggs is income that may be used to pay taxes, interest, or other necessary financial obligations. there are egg markets in all large cities, which supply the local demand and which in the Yangtze Valley and North China furnish eggs to drying plants for the export trade.

Little effort is made to maintain breeds of chickens. The Langshank, a large long-legged meat bird, is found in a few sections; otherwise there are no special breeds.

GROWTH IN FOREIGN AGRICULTURAL TRADE

EARLY DEVELOPMENTS

The foreign trade of China dates back to a very early period, when, although small compared with the present volume, it was quite significant. Even before the Christian Era, at a time when the Chinese had not fully established themselves over the whole of the geographical area now known as China, trade in the products of their country reached as far as the Mediterranean world. The expansion of the Roman Empire into Asia Minor possibly facilitated this early trade, which was entirely overland.

Silk was the most noted early export from China and was traded for metals, dyestuffs, precious stones, coral, and ivory. Silk fabrics were highly prized by the well-to-do women of the Roman Empire, and the trade was very profitable. The production of silk appears to have been a mystery in the West and many stories are told of the efforts made to discover the secret. Europeans in the sixth century after Christ were finally successful in learning how to produce silk; and the demand for the Chinese product, which had hitherto held a monopoly position, was eventually reduced.

The land route between China and the Mediterranean countries was probably closed most of the time from the eighth to the twelfth centuries, when the Huns and other Tartar tribes were carrying on warfare in central and western Asia. This route, though used later, was never again significant. Marco Polo in 1278 probably used this route from Venice to Peking.

Trade by sea developed in the early centuries of the Christian Era. Chinese records show that their sailing vessels in the fourth and fifth centuries carried on trade with Indochina, Siam, the Federated Malay States, India, and Ceylon. By the eighth century this sea trade had centered itself at Canton, where it was of sufficient importance for the Chinese Government to appoint an official as Inspector of Maritime Trade.

After the discovery of the use of gunpowder, which gave them a weapon against pirates, and of the compass, the Chinese extended their maritime trade to Arabia and the coast of Africa. For several centuries the Chinese and Arabs carried on the trade between China and Europe. In the fifteenth century this trade was disrupted by the Turks, and Europeans began their search for a shorter route to Asia, which resulted in Columbus's discovery of America.

The chief items of export from China during these several centuries were silk and tea. During the first half of the eighteenth century the three important articles exported were tea, silk, and cotton piece goods. Europeans found difficulty in finding articles they could induce the Chinese to buy in exchange, and for a long time they were practically limited to silver and gold. China was self-sufficient and had a favorable balance of trade until some time in the nineteenth century.

Exports of cotton piece goods to Europe were a thing of the past after the development of the machine-made textiles in England in the last half of the eighteenth century. English traders attempted to develop a market in China for woolen goods, but it took many decades before they were able to sell any large quantity.[21]

European traders during the eighteenth century introduced opium into China from India and by the beginning of the nineteenth century had cultivated an important market. With this increasing demand, foreign traders were able to sell larger amounts each year and at such prices that soon China's silk and tea exports were insufficient to balance the trade. An unfavorable balance developed that lasted until about 1850, when exports of silk and tea again became very heavy and it was again necessary to import bullion. This increase in exports was largely the result of opening the port of Shanghai in 1842 to foreign trade.

American merchants became interested in trade with China shortly after the Boston Tea Party in 1773, when the source of tea from the English traders was shut off. Immediately after the close of the American Revolution, plans were made to obtain tea direct from China. In February 1784, the *Empress of China*, a sailing vessel, started for Canton by the way of the Cape of Good Hope with a cargo largely of ginseng. This ship returned 15 months later with the first tea brought on an American vessel from China, and it was reported that a handsome profit was made for the owners.

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[21] Martin, R. Montgomery, *China: Political, Commercial, and Social,* James Madden, London, 1847, Vols. I and II.

Several vessels were soon prepared for trips to China. John Jay, then Foreign Minister of the United States, was interested in this trade. In 1786, Samuel Shaw was commissioned by Congress as the first American consul to Canton. The trade with China developed rapidly, and by 1817 the United States was importing annually over 5 million dollars' worth of goods and China - in spite of its great distance - ranked seventh in the American foreign trade.

Tea was the outstanding product imported into the United States from China during the early years of trade. Silk imports from 1820 to 1835 represented about one-third of the value of the goods received, and cotton piece goods over 10 percent by about 1830. Minor imports consisted of sugar candy, camphor, chinaware, firecrackers, and rhubarb.

American merchants, however, had considerable difficulty in finding goods for exchange. The market for ginseng was limited and it was necessary to ship bullion to China, of which the United States had a very short supply at that time. In later years American merchants were able to furnish furs and sandalwood for the Canton market.

DEVELOPMENT FROM 1868 TO 1936

Beginning in 1868 Chinese import and export figures, although somewhat incomplete, give an indication of the foreign trade of the time. These data reveal that agricultural goods were a very important part of the trade. From 1868 to 1870 agricultural commodities represented 95 percent of total exports and 50 percent of imports. Tea and silk were the outstanding exports during this period and sugar, raw cotton, and cereals the minor items. Among the imports, cotton piece goods was the outstanding item. Other agricultural imports were cotton yarn, raw cotton, and woolen piece goods. It is to be noted that China at this time was producing sufficient food and was even exporting a small quantity.

From 1870 to 1900 there was a continuous growth in China's agricultural export trade with only a few changes in the relative importance of the different commodities. Tea exports, which were first in importance in 1870, reached their peak during this period and by 1900 had declined to second place. Silk exports had increased in quantity and value, and by 1900 silk was the leading item. Sugar exports had increased but were still unimportant. Several other commodities, such as hides and skins, raw cotton, and vegetable oilseeds, had become significant.

From 1870 to 1900 changes in imports were few. Cotton piece goods and yarn, which represented 32 percent of the total value of imports in 1870, continued to be China's leading import commodities. Food imports, principally rice and sugar, had become a factor by 1900. Imports of woolen goods declined during this period from 10 percent to 1½ percent.

From 1900 to 1930 some important changes took place in both exports and imports. Agricultural commodities, which in 1900 represented 72 percent of total exports, had increased by 1930 to nearly 85 percent, whereas during the same period agricultural imports had increased only about 4 percent, to 54 percent of the total.

Table 17. Export trade of China, by value, 1870 to 1936

COMMODITY	1870	1880	1890	1900	1910	1920	1930	1936
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Silk	38.5	37.9	33.8	30.4	25.4	18.9	16.0	8.2
Tea	49.6	45.8	30.5	16.0	9.4	1.6	2.9	4.3
Raw cotton	–	–	3.4	6.0	7.4	1.8	3.0	4.0
Hides and skins	–	–	1.4	4.3	5.3	3.4	2.2	4.9
Soybeans and bean products	–	–	–	1.9	5.6	15.6	23.3	0.8
Other vegetable oils and oilseeds	–	–	–	2.5	8.4	7.8	11.5	18.8
Eggs and egg products	–	–	–	–	1.0	4.0	5.7	5.9
Cereals	–	–	–	–	1.4	10.6	4.6	3.2
Miscellaneous–								
Agricultural	5.7	6.6	8.8	10.9	10.6	13.3	15.2	29.9
Nonagricultural	6.2	9.7	22.1	28.0	25.5	23.0	15.6	20.0

Compiled from *Foreign Trade of China.*

The outstanding features in the export trade during this period were the decline in importance of China's long-established commodities, tea and silk, and the rise in exports of vegetable oils and oilseeds. Exports of eggs and egg products became important during the last half of the period and represented 5.7 percent of the total in 1930.

A significant change in imports is noted during the period 1900-1930. As a result of the rapid expansion in number of cotton mills in China after 1920, imports of cotton piece goods and yarn declined rapidly but imports of raw cotton increased. Foodstuffs, mainly rice, wheat, and wheat flour, showed a great increase. This increase took place after the World War and was largely the result of political chaos in China, which made it difficult for people in port cities to obtain their food supplies from the interior.

Table 18. Import trade of China, by value, 1870 to 1936

COMMODITY	1870	1880	1890	1900	1910	1920	1930	1936
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Cotton piece goods and yarn	32.0	29.4	36.0	35.8	28.2	34.3	11.9	2.0
Raw cotton	4.7	0.1	1.2	0.9	0.9	2.4	10.1	3.8
Wool and woolen goods	10.4	7.3	2.8	1.6	0.9	0.7	1.4	3.1
Cereals	–	–	9.0	5.4	7.5	1.0	12.5	4.7
Tobacco	–	–	–	–	2.0	4.8	4.5	1.8
Sugar	–	–	–	3.0	4.8	5.2	6.6	2.2
Miscellaneous–								
Agricultural	2.6	3.7	2.4	2.6	2.3	4.6	6.8	6.4
Nonagricultural	50.3	59.5	48.6	50.7	53.4	47.0	46.2	76.0

Compiled from *Foreign Trade of China.*

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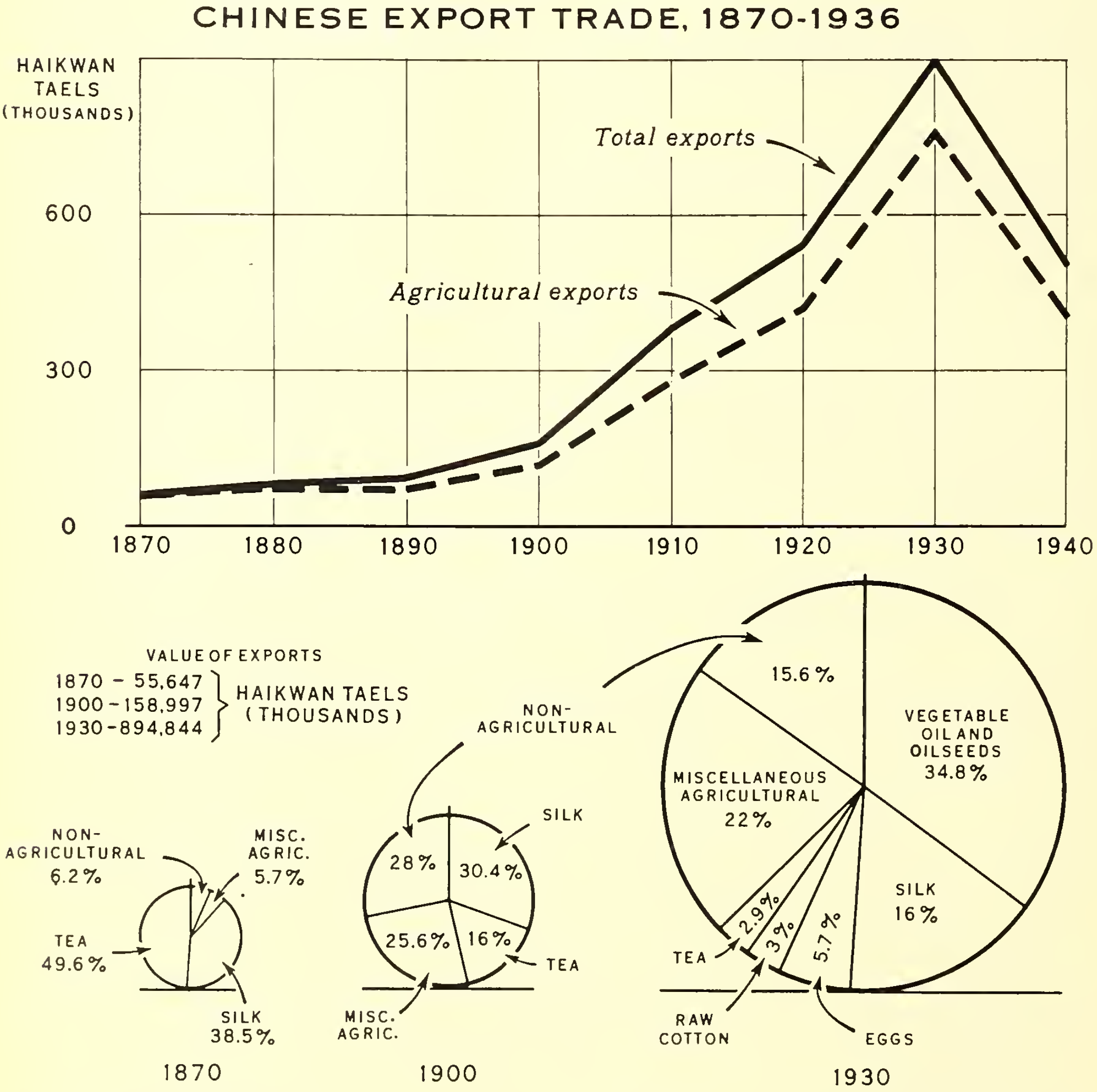
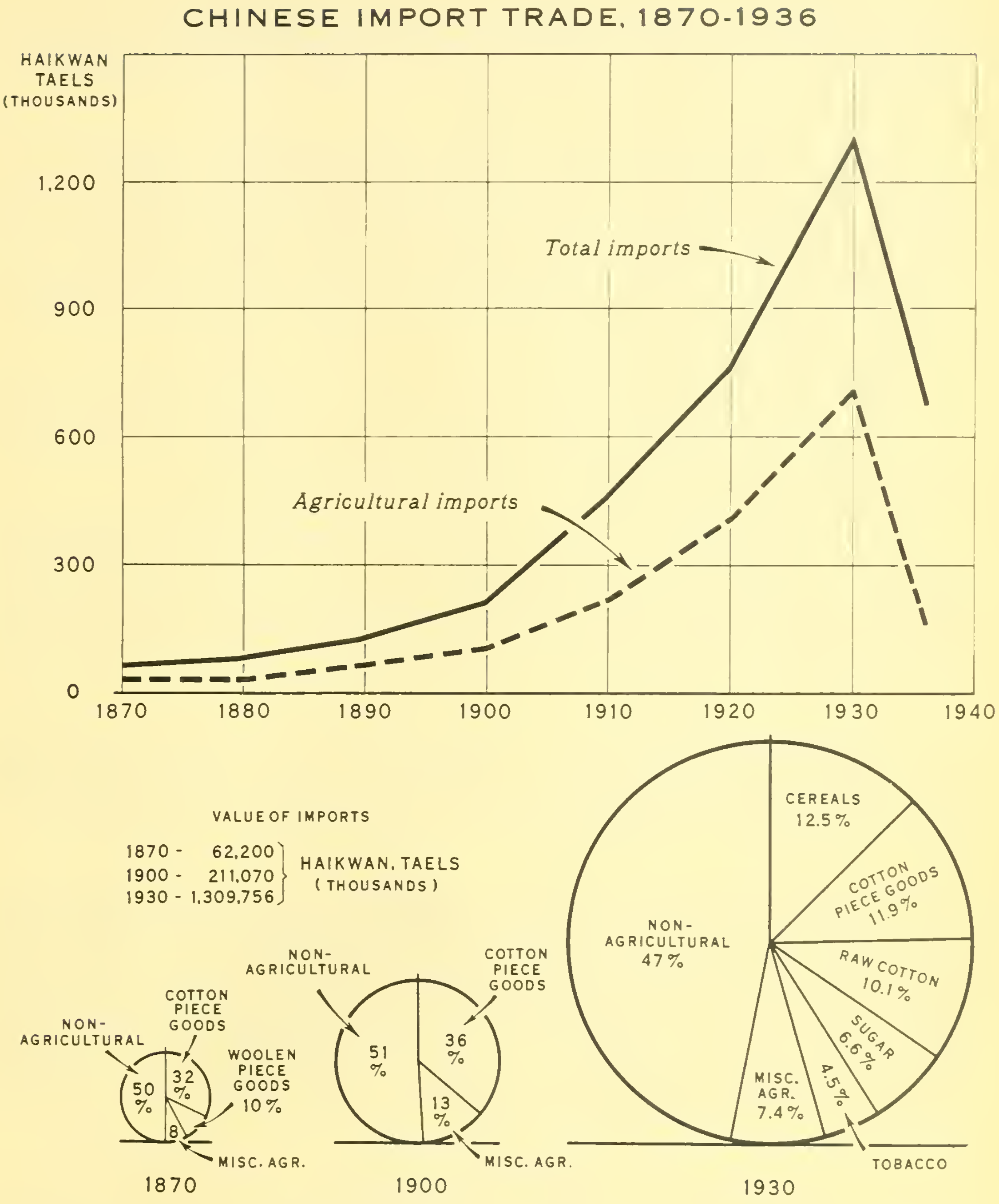
The leading supplier of China's agricultural imports in 1930 was the United States. The value of American farm commodities imported by China at that time amounted to 53 million dollars and consisted principally of raw cotton, leaf tobacco, wheat flour, wheat, fruits, and dairy products. The leading markets for China's agricultural exports were Japan, Germany, England, and the United States. The value of the agricultural goods exported to the United States in 1930 was 44 million dollars, and the chief items were silk, wood oil, peanut oil, hides and skins, egg products, carpet wool, sesame seed, and bristles.



U. S. DEPARTMENT OF AGRICULTURE NEG. 35727 BUREAU OF AGRICULTURAL ECONOMICS

Fig. 25.



CHINESE IMPORT TRADE, 1870-1936

U. S. DEPARTMENT OF AGRICULTURE NEG. 35726 BUREAU OF AGRICULTURAL ECONOMICS

Fig. 26.

Between 1930 and 1936 further changes took place in China's agricultural trade. The expansion of the agricultural export trade, which had continued over a long period, ended in 1931. The loss of Manchuria, which had contributed from 25 to 30 percent of the agricultural exports, and the world depression, which greatly reduced the demand, were the primary factors.

During 4 years of this period, 1930 to 1933, agricultural imports were the highest in the history of China. The combined annual value of rice, wheat and wheat-flour, raw-cotton, and tobacco imports amounted to 140 million dollars. The United States was the principal source of the cotton and tobacco imports and also a substantial quantity of the wheat and wheat flour. The chief causes of the heavy imports were short harvests, low prices of foreign commodities, and the fact that the disrupted internal transportation facilities had not been fully restored.

Beginning in 1934 agricultural imports began a sharp decline and by 1936 were the smallest in 15 years. This marked reduction was the result of China's reduced buying power, larger domestic crops, stable political conditions, and governmental policy to make the country self-sufficient in agricultural products.

In 1936, vegetable oils and oilseeds were, as in 1930, the principal export commodities. The large decline in this item was almost entirely due to the loss of the Manchurian soybean exports. Sesame seed, peanuts, and tung oil were the leading vegetable-oil and oilseed exports. Silk was still the second most important export item, but the value, though not the volume, had shown a considerable decline since 1930.

The leading buyer of China's agricultural exports in 1936 was the United States, followed by Japan and England. The value of the agricultural goods shipped to the United States in 1936 amounted to 40 million dollars. They consisted principally of tung oil, wool, hides and skins, bristles, silk, and peanut oil.

China's 1936 agricultural imports, the smallest for a number of years, were larger, however, than the official figures indicate because of the extensive smuggling in North China during the year. The most significant feature of the import trade was the smallness of cotton piece-goods imports. Raw-cotton imports also declined. The importation of foodstuffs, such as rice, wheat, and wheat flour, were the lowest in more than a decade. The value of United States agricultural commodities imported into China had fallen from 44 million dollars in 1930 to 9 million in 1936. Leaf tobacco, raw cotton, wheat flour, dairy products, and fruits were the principal American items then imported.

SUMMARY AND OUTLOOK

In studying Chinese agriculture, one is greatly impressed with the significant role government, or the lack of it, has played in the industry. China furnishes an example of a country that at various times has been without a government or with one that was unable to be of service to the people and permitted the status of agriculture to sink to a very low level. This was true much of the time between 1911 and 1930. The only thing the farmer could do during such times was to eke out an existence on the land. There were no facilities to assist him to attain a higher standard or to provide protection for his home or crops - no way to obtain better seed or learn improved methods, to market a surplus if he was able to produce it, or to obtain reasonable credit. These conditions militated against his developing any incentive to improve his own status.

The central Government of China from 1931 to 1937 began work along numerous lines to improve agriculture. Though many of the things planned never got beyond the experimental stage, the improved transportation enabling better marketing, the credit organizations, and the more stable political conditions were very beneficial to agriculture. Some of the most noteworthy enterprises were the reconstruction of railroads and extension of new lines, establishment of through freight traffic, abolishment of the *likin* (tax system), and aid in lowering interest rates for the rural cooperative credit societies. As a result of these Government efforts, along with fairly good harvests in 1936 and 1937, Chinese agriculture and the Nation in general appeared to be heading toward a more prosperous future.

At the present time (October 1939), after more than 2 years of the Sino-Japanese conflict, Chinese agriculture is again sinking to a low level, especially in the areas where the Chinese Government is no longer in control. Political chaos in the occupied areas has caused a breakdown in the marketing of farm products. Flour and cotton mills and other industrial plants utilizing agricultural products are only partially operating. Nothing is being done to prevent floods, and many of the agricultural experiment stations have been unable to continue their work. In these areas the farmer is again reduced to producing barely sufficient food for his own family. Coastal cities are once more having difficulty in obtaining their agricultural needs from the interior and must resort to the purchase of a larger proportion of their food and clothing from foreign countries. The United States is in a favorable position to furnish many of these needs. China, however, cannot continue to import heavily for long without being able to export.

Agriculture in areas controlled by the Chinese Government at the present time has suffered less from the Sino-Japanese conflict. A stable Government has been maintained and favorable crops have been harvested, though some of the important market outlets have been cut off and farm prices have been low. Because of the difficulty of exporting and importing goods, agriculture in this region has become more self-sufficient; and as long as hostilities continue it is likely to become less important in international agricultural trade. When peace is restored in this part of the country, it will take some years to build up the export and import trade again.

When hostilities cease, China will undoubtedly again resume its place in international agricultural trade. The Nation has demonstrated its ability to produce a surplus of agricultural commodities and its desire to exchange these for the agricultural and industrial goods of other countries.

A study of Chinese agriculture in relation to that of the United States indicates that they are in many respects complementary. China frequently provides a market for such commodities as raw cotton, leaf tobacco, wheat, wheat flour, and fresh fruits, of which the United States has an exportable surplus. Chinese surplus agricultural products desired in the United States consist primarily of tung oil, hides and skins, bristles, carpet wool, tea, and silk. Agricultural imports from China, therefore, may increase materially without adversely affecting American agriculture. In fact, Chinese buying power can be strengthened by the United States importation of its products, thereby improving the ability of China to buy American agricultural products.

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